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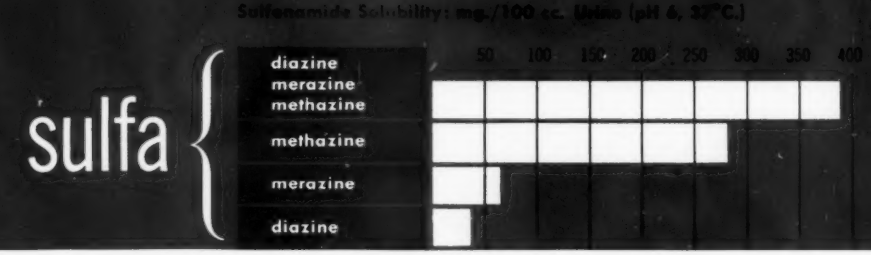

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The Central Nervous System In Infectious Diseases of Childhood

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WITHIN recent years a great deal has been written on the importance of social and environmental factors in abnormal child behavior. Most of these behavior disorders have been related in one way or another to parental conflict, broken homes, sibling rivalry, parental rejection, overindulgence, etc. Such factors, indeed, may be of primary importance in many cases, but they often leave many unanswered and troublesome questions. They do not explain, for example, why a child will develop normally for a number of years and then suddenly, in spite of constant environment, begin to manifest abnormal behavior. These factors also fail to explain why a difficult personality problem will occur suddenly in an isolated member of a large family when apparently all the children are exposed to the same environmental influences. Finally, it is a little difficult always to accuse the interfamily relationships for the behavior problems of children, particularly when one realizes that most of a child's time, when over 5 years of age, is spent in school among playmates and not at home with the parents and siblings.

Is it not time to pause and re-evaluate this most important problem in the light of the facts that are available? Is it not possible to find some better and more obvious explanation for these unfortunate behavior abnormalities rather than to continue to condemn the parents, siblings, and playmates, all of whom stand by bewildered and traumatized by this sudden affliction thrust upon them? Certainly recent evidence shows that these behavior problems in children might be more fundamental than merely a forced interpretation of environmental reactions. For example, in electroencephalographic studies of a large series of children manifesting behavior disturbances, over 60 per cent have demonstrated changes; this indicates some abnormal function of the brain, an abnormality which must be considered as organically determined.

What then can be the causative factors in the sudden precipitation of such problems in children? Obviously whatever the etiologic factor, it must fulfill four special requirements: (1) It must have a very wide geographic distribution since behavior problems in children occur with equal frequency in all parts of the country. (2) Such an etiologic process must be extremely frequent since many youngsters in widely separated families and communities become involved. (3) It must affect children primarily since these personality problems are

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seen much more frequently in the younger age group. (4) It must be a very ordinary, well-accepted condition since families are unable to account for these behavior changes in their children and hence have been unaware of anything unusual having occurred.

There is one group of conditions that could very well answer satisfactorily all the above requirements, namely the infectious diseases of childhood. These diseases affect chiefly children, are widespread in distribution, and are so common that they are accepted as being of no consequence by most parents. Still, many of these illnesses result in low grade cerebral involvements and as a result produce definite behavior problems in the recovering child. So important are the cerebral complications of these infectious diseases that it might be of value to pause and review this problem at this time.

MEASLES

ENCEPHALITIS is said to occur in about 0.5 per cent of measles. The earliest reports on nervous complications were by Odier[1] in 1722, Nevel[2] in 1724, and Lucas[3] in 1790. Since that time a great number of cases have been reported. Despite its rarity, this nervous complication is more common than that following other infectious diseases. Boenheim[4] observed it in 0.4 per cent of 5,940 cases of measles; Peterman and Fox[5] 14 times in 27,081 cases in 1938. Both sexes are affected and it is most often seen in children under 10 years of age. Cases make their appearance periodically. In one clinic in New Zealand 5 cases were seen in a short period, whereas none occurred during the previous ten years. The severity of the measles seems to bear no relation to involvement of the nervous system.

Clinical features—The clinical picture is variable, depending upon the location of the lesions. Most of the symptomatology is referable to a cerebral involvement; however, findings attributed to the cerebellum, brain stem, meninges, and spinal cord are also seen.

Evidence of neural involvement usually occurs four to six days following the appearance of the rash which is often fading. The fever which is falling usually reveals a concomitant secondary rise. The patient soon becomes drowsy, stuporous, and even comatose. Some cases start dramatically with epileptiform seizures often followed by unconsciousness. There may be headache, vomiting, pupillary changes, muscular twitchings, and rigidity of the neck.

Many patients show improvement after three or four days; however, in others the symptoms progress, resulting in respiratory irregularities, papilledema, and various focal signs. Hemiplegias and aphasias are not rare. Gilman[6] reported a case in which only the auditory and visual centers were involved. Horwitt's[7] patient complained of auditory hallucinations. Diplopia, dysphagia, urinary retention, confusion, and various other mental aberrations may also occur in these patients.

The neurologic examination, like the clinical picture, reveals a multiplicity of extremely variable findings. The pupils are frequently dilated and fixed to light but may be constricted. There may be conjugate deviation of the

eyes and head. Facial paresis or twitching is not infrequent. The reflexes may be increased or decreased. Clonus and spasticity are common and may be followed by flaccidity or areflexia. Hemiplegia and various palsies are not infrequent. Meningeal signs such as cervical rigidity, positive Kernig and Brudzinski's signs may occur. Ataxia and incoordination of cerebellar origin have been observed. Some cases manifest principally spinal cord alterations evidenced by signs of a transverse or disseminated myelitis.

The spinal fluid is under increased pressure in over half the cases. A majority of patients reveal a pleocytosis in the spinal fluid comprised largely of lymphocytes.

From 113 cases in the literature and 12 of his own Ford[8] found a mortality rate of 10 per cent. Death may occur within a few days or may be delayed for several weeks. Milder cases recover in a few days or within a few weeks. Recovery may be rapid and complete. Ford found evidence of residual symptoms in 65 per cent of the cases he reviewed. The sequel in 30 per cent was ataxia, in 12 per cent mental defect, in 17 per cent a personality change, and in 5 per cent epilepsy. Spastic paraplegias, hemiplegias, and various hyperkinetic phenomena have also been noted as residues.

ONE of the most frequent complications in children is a marked personality alteration similar to that following epidemic encephalitis. A previously well adjusted youngster, after recovery from the acute illness, becomes progressively more difficult to manage. Lying, stealing, profanity, and sexual misbehavior become progressively more manifest. Children who had been doing well in school show difficulty in keeping up with the class and undergo definite deterioration. Only careful history of the child's previous personality and the preceding illness suggest the possible etiologic factors. Often the actual encephalitic symptoms are extremely mild and minimized by both family and physician. It is only after the development of the severe sequelae that the encephalitic involvement is emphasized.

Pathology—Good descriptions of the pathologic features have been recorded by Musser and Hauser,[9] Baker,[10] and Ferraro and Sheffer.[11] On section of the brain one can see foci of softening principally in the white matter of the cerebrum, cerebellum, and brain stem. Microscopically, the typical lesion consists of a thin-walled vessel surrounded by an almost circular zone of rarefied brain tissue. These perivascular zones of demyelinization are usually invaded by microglial elements. Perivascular cuffing with mononuclears does occur and in some instances provides the predominant alteration. The lesions show a preference for the subependymal and marginal regions. Cord lesions are apt to be numerous and are similar to those in the brain. Cases have been recorded which involved primarily the spinal cord.

Case 1—M. A. D., a 12-year-old female, had an attack of measles at the age of 6 years. The rash disappeared in one day, and she seemed to be recovering rapidly. One week later she had a severe relapse and became delirious. After three weeks in bed she improved slowly and by the end of one month had apparently recovered completely. She went back to school where she soon began to have difficulty in learning. She failed in several grades.

About this time the first personality changes were noted. The child manifested frequent emotional outbursts and became very stubborn. She began stealing things at school and became very sensitive about her difficulties. She also began to manifest bizarre ideas and behavior. At one time she took a cat to a local doctor's office and insisted that he draw blood from the cat for the Red Cross. She refused to give her name and address so the police were called, and she was hospitalized.

While at the hospital she became quite violent and had to be restrained. She had a number of bizarre hallucinations and delusions. She saw a fire in the incinerator and thought they were going to burn her. She thought she was in a Japanese concentration camp surrounded by Nazi guards. She improved sufficiently so that she was sent home in seventeen days. She demanded to be sent back to school where she was placed in a special class. However, within a short time, she developed a great religious fervor. She began praying excessively and saying "Jesus is my guardian," "God is coming for me," etc. She began seeing God and answering questions as if she had been spoken to. She was again admitted to the hospital and placed in the disturbed ward of the psychiatric unit. She showed no great concern over her health. She remained aloof and

distant toward the interviewers. She was haughty, uncooperative, and uninhibited. However, she still got along fairly well with the other patients. There was a great deal of evidence of mental deterioration. She showed silly behavior and inappropriate laughter. She was euphoric and depressed by turn. She showed a mild flight of ideas and in general seemed very immature for her age. It was finally necessary to commit her to a state institution.

Case 2—S. J. S., a 9-year-old female, became ill with measles on April 22, 1944. She made a complete recovery and was ready to go back to school on May 6, when she found she could not walk. She was able to move her arms and legs but could not walk. She gradually became worse so that on May 9, she could not move her arms or legs. At the onset, nothing was wrong with her speech, but a few days later her speech became unintelligible, "like that of a baby." She formed words and would say phrases. She soon developed a generalized body tenderness which lasted for a few days and then changed to a numbness. The reflexes of the arms and legs were absent until May 12, when they partially returned. She had no strength and could do nothing by herself. On May 19, she started sitting up alone. Her speech returned to normal before May 19. On May 23, she walked three blocks with assistance on both sides. She gradually improved, and on May 29, she could walk alone. The strength of the arms returned along with that in the legs.

As recovery occurred, a marked change was noticed in the patient's behavior. Before her illness, she was a very happy, cheerful girl, very easy to get along with. Following her measles she became more irritable and temperamental. She angered easily, and recovered very slowly from these anger spells. She developed a great fear of cars and, even when with her family, refused to cross the street. She remained neat and tidy in her dress and was never destructive. Her memory and orientation have been normal.

RUBELLA OR GERMAN MEASLES

ENCEPHALITIS occurs rarely as a complication of German measles. Bernard[12] found 13 cases with nervous involvement in 291 cases of German measles, and Read[13] was able to find only 19 cases recorded in the literature up to 1937. A majority of the cases take place after the age of puberty. In Davison and Friedfeld's[14] 6 cases, 4 were over 14 years of age.

Clinical features—Nervous involvement appears two to six days following the appearance of the rash. Not infrequently the rash clears and a latent period of one to six days may precede the neural symptoms. The onset is often abrupt and dramatic. The first indication of encephalitis may be manifested by apoplectiform loss of consciousness or a convulsive seizure, either Jacksonian or generalized. Other cases are more gradual in onset with the patient complaining of headache and vertigo. Irritability and vomiting are often noted early. In rare instances the patient merely manifests a progressive drowsiness which may be accompanied by signs of focal involvement.

Symptoms referable to the spinal cord and brain stem may appear and consist of paraplegia, radicular pains, urinary retention, incontinence, diplopia, and various cranial nerve palsies. Cases of maniacal delirium have been reported in which the patient injures himself, screams, and claws his body violently. Coma may be intermittent, changing even from hour to hour. The complaint of nuchal pain may be an early sign of meningeal involvement.

The neurologic examination reveals disseminated involvements manifested by a multiplicity of findings. The cranial nerves disclose alterations such as dilated pupils sluggish to light, nystagmus, strabismus, conjugate deviation of the eyes or head, optic neuritis, photophobia, hemianopsia, and facial paresis. The deep reflexes may be increased or lost. Clonus and evidence of pyramidal involvement are not infrequent. The abdominals are often absent. Twitching of the face and extremities occurs occasionally. Hemiplegia and various combinations of upper and lower motor neuron palsies have been recorded.

Meningeal involvement occurs in less than half of the cases. Incoordination is found in certain instances and actual cerebellar signs such as ataxia and adiadokokinesis have been reported. Bulbar involvement foretells a grave prognosis and is manifested by respiratory irregularities or dysarthria. Most cases reveal some elevation of temperature which is apt to be high in fatal cases. It is not uncommon to find cases with a polymorphonuclear leukocytosis in contrast to the usual leukopenia in German measles. The spinal fluid may be nor-

mal but frequently shows alterations.

The course of this variety of encephalitis is usually self-limited resulting in complete recovery. The mortality is roughly 10 per cent, similar to that reported in measles. A few fulminating cases result in death in one or two days. The occasional patient may expire during status epilepticus. In contrast to measles, sequels seldom occur; however, most authors feel that too few cases have been followed to preclude definitely late after effects.

Pathology—The perivascular demyelinization so common in measles has not been found in rubella encephalitis. The nerve cells of the cortex and cranial nerve nuclei reveal both acute and chronic alterations. Lymphocytes and plasma cells are found perivascularly and microglial elements are frequent in the grey and white matter of the cerebrum, and brain stem. Perivascular extravasations occur and a mild meningitis is often present. In some instances a proliferative endarteritis has been discovered.

CHICKENPOX

Considering the prevalence of this disease, involvement of the nervous system is extremely rare. Underwood,[15] reviewing the literature up to 1935, uncovered 133 reported cases.

Clinical features—The encephalitis usually begins between the fourth and the tenth day of the illness. Occasionally it precedes the rash by a few days, or the cerebral involvement may be delayed for as long as three months. There is no relationship between the severity of the varicella and the nervous complications; mild cases may be followed by severe cerebral symptoms. As a rule the encephalitis is very benign and recovery, although delayed, is usually complete. A few cases have been reported where the involvement has been so severe that fatal termination resulted in a few days (Zimmerman and Yannet[16]).

The encephalitic symptoms are usually polymorphic and consist of mild headache, vomiting, severe vertigo followed by transient attacks of diplopia. A very common feature is a concomitant dulling of the intellect manifested by a lassitude, somnolence, or even deep coma. Convulsions and various motor involvements such as monoplegias, hemiplegia, and aphasias have been reported but are rare. Probably the most common clinical picture seen is that due to cerebellar involvement and consists of ataxia, vomiting, slurred or scanning speech, nystagmus, vertigo, and tremors. The Romberg sign is often positive. Occasionally choreo-athetotic movements are seen. There has been reported a curious type of cerebral complication in which the chief symptom consists of tremor involving the head, extremities, or the entire body. It may be of a slow rhythmic type or may resemble a Parkinsonian tremor. The duration of this tremor is variable but usually lasts about three weeks.

When a meningoencephalitis occurs, the clinical picture is somewhat different. The onset is heralded by an intense headache followed by vomiting and sensorial changes. In this type, convulsions and epileptiform seizures are common. The meningeal symptoms soon appear and consist of nuchal rigidity, neck retraction, Brudzinski and Kernig's signs, and severe stiff neck.

The spinal fluid shows no increase in pressure. The cell count is either normal or only slightly increased up to 50 cells, mostly mononuclears.

Recovery begins during the second week of the illness and is often very slow. Frequently during an apparently normal recovery there will be a sudden relapse with a return of symptoms or the sudden appearance of new symptoms while the old ones are fading. Such exacerbations may occur many times during an apparently normal recovery. Recovery, though delayed for months or years, is usually complete. Sequels do occur. Choked disk followed by optic atrophy and blindness has been reported by Ratner,[17] and deToni[18] reported a residual total unilateral ophthalmoplegia. Sachs[19] studied a case in which a residual mental retardation and idiocy occurred.

Pathology—Only a few pathologic reports are available for study. Microscopically there occur definite changes within the ganglion cells of the cortex and perivascular demyelinization of the white substance. Zimmerman and Yannet's[16] patient showed extensive swelling and vacuolization of all the nerve cells. Most investigators have described large areas of perivascular demyelinization scattered throughout the white substance.

Case 3—C. R., aged 9 years, developed a mild case of chickenpox and after one week seemed to have recovered completely. However, her gait began to show noticeable ataxia. The gait disturbance became more marked and after two days the patient was placed on bed rest. Concomitant with the ataxia a change was noted in the patient's speech.

A neurologic examination revealed normal optic disks. The eye movements were not restricted, but were slow and jerky. There was a very slight paresis of the lower face on the left. The tendon reflexes were all absent and no abdominal reflexes could be obtained. The patient was restless and fidgety. There was a suspicion of early choreiform movements. Coordination was disturbed bilaterally. There was a definite decomposition of movement along with dysmetria and a suggestion of cerebellar rebound. The patient was ataxic, walking with a wide base and deviating and falling to the left. Speech was slow, monotonous, and noticeably ataxic.

The patient was placed on small doses of phenobarbital and was kept on bed rest. Examination one week later revealed definite rapid, jerky choreiform movements of the face, tongue, hands, and feet. The patient was still quite restless and hyperkinetic. Except for a very slight irritability, nothing could be found to suggest any change in her sensorium and intellect.

After receiving increased sedation for several days the patient became less hyperkinetic and the chorea and coordination seemed to be slightly improved. Coordination improved in the limbs on the right with a moderate incoordination persisting in the extremities on the left. After a period of about three weeks the dysarthria was definitely improved.

All of the patient's symptoms slowly but steadily abated. After a period of two months the patient was permitted to be taken to the bathroom and to the dining room for meals. About two weeks later she started to be up and around. At first she was very unsteady and walked with a broad base. The incoordination of the extremities was almost gone. The movements on the left were still a little loose and irregular; however, there was no dysmetria.

During the following two months a slow improvement still continued. Her gait became normal, the patient walking quite casually even with her eyes closed. The only suggestion of ataxia was noted when the patient placed one foot before the other in tandem fashion with her eyes closed. A few choreic movements of the tongue and fingers still could be brought out. Her speech was entirely normal and she was able to repeat test phrases with ease. Except for the initial period of mild restlessness and irritability the patient showed no evidence of any personality disturbance. On the contrary she was very cooperative and patient for a child of her age.

SMALLPOX

Encephalitis complicating variola is uncommon even when smallpox is prevalent. Marsden and Hurst[20] reported 7 cases among 11,408 cases of smallpox in the London County Council Smallpox Hospital between 1928 and 1931. Spiller[21] recorded 7 cases in a series of 2,800 cases of smallpox. Such complications may occur at any stage of the disease, even during the incubation period or advanced convalescence (Spiller), but the most frequent time of onset is from 5 to 13 days after the appearance of the rash.

Clinical features—Clinically the neurologic findings in these patients are divided into two main groups. In the first group the most prominent feature is a disturbance of speech accompanied by some ataxia of all limbs and some mental disturbances (Westphal,[22] Aldrich[23]). The onset of the speech disturbance is sudden and consists of a motor aphasia which may persist for months. Speech returns slowly but at first results in unintelligible sounds. Later speech assumes a typical slow, monotonous form which may persist for years or may be permanent. Ataxia may be associated with the speech impairment or may occur independently. The mental symptoms vary from a mild delirium to an acute mania or even a severe mental degradation (Aldrich,[23] Kiernan[24]). These mental symptoms usually clear up although they may persist for years. In a few cases the resulting dementia has been permanent. Improvement in this type of involvement is invariably slow but the course is favorable.

The second type of complication is characterized by a flaccid paralysis of the limbs without sphincter disturbances (Marsden,[25] Troup

and Hurst[26]). The paraplegia develops rapidly and is usually confined to the lower limbs. Sensation is not disturbed although complete sensory loss may occur. Sometimes the paralysis is rapidly ascending resembling Landry's paralysis and results in death within a few days from bulbar involvement. The patients that recover have residuals such as paresis, muscle deformity, and abnormal behavior.

In both the above types of post-smallpox encephalitis there are associated symptoms indicative of a diffuse cerebral involvement. The temperature becomes elevated and is accompanied by drowsiness which in the more severe cases soon progresses to stupor. Headaches and pupillary inequalities are also present at this time. Frequently as the illness progresses, bulbar symptoms manifest themselves in the form of breathing and swallowing difficulties. The latter involvement may prove fatal even though the rest of the clinical picture appears to be progressing favorably.

The spinal fluid often shows a mild pleocytosis, mainly mononuclears. The spinal fluid protein may be elevated.

There seems to be no relationship between the severity of the smallpox and the frequency or severity of the nervous system involvement. Severe paralysis may follow a case of smallpox so mild that the patient does not go to bed.

Pathology—The lesions in the nervous system are most striking within the spinal cord (Aldrich,[23] Marsden and Hurst,[20] Troup and Hurst[26]). Marsden and Hurst have reported alterations within the cerebrum. Grossly, the brain shows grayish, translucent rings throughout the white matter. Microscopically, there is a demyelinization about numerous small vessels. Marsden and Hurst suggested this lesion be called "acute perivascular myelinoclasis."

The chief lesions in the cord consist in intense perivascular demyelinization involving almost all the vessels.

SCARLET FEVER

Nervous complications following scarlet fever are relatively uncommon, some 50 cases having been reported in the literature. Quandt[27] observed 12 cases in a group of 783 patients with scarlet fever or 1.5 per cent while Top and Gordon[28] in a series of 17,311 cases observed but 35 cases of encephalitis for a total of 0.2 per cent.

Clinical features—The cerebral complications usually occur during the period of convalescence, but have been recorded from a few days to a few months after the onset of the scarlet rash. The clinical picture may be most variable depending upon the location of the pathologic lesions. Most commonly there occurs a meningoencephalitis (Martin and Champion,[29] Ferrand, Schaeffer, and Martin[30]). The onset of symptoms is usually very abrupt although prodromes may be present for a few days in the form of mild headache or malaise. More commonly during a normal convalescence there suddenly appears a secondary rise of temperature associated with most intense headache, vomiting, photophobia, and mild somnolence. There soon appear signs of an associated meningitis consisting of pain in back of neck, stiff neck, and some rigidity of back. Irritability, restlessness, and delirium may be present. The somnolence progresses to a stupor and finally to a deep coma. Convulsions are extremely common. These may be localized or general and are frequently followed by a hemiplegia or a paraplegia either of a spastic or flaccid type. Sphincter disturbances have been reported. Less common forms of involvement have been reported. Schilder[31] and Dagnelie and Dubois[32] reported cases in which cerebellar symptoms predominated. Urechia[33] recorded cases in which mental symptoms of agitation, confusion and hallucinations dominated the picture. In one of his cases the encephalitic involvement manifested itself in choreiform movements and a tremor.

Spinal fluid is usually under normal pressure. It is usually clear but in the severe cases may be blood-tinged. There is a mild pleocytosis, the highest cell count reported being 212 cells. The protein may be moderately increased.

After a few days improvement begins and proceeds to complete recovery in spite of the

apparent gravity of the encephalitis. Recovery is the rule and occurs within a few weeks to a few months. Death occurs in about 15 per cent of the cases while about 40 per cent recover only partially and have permanent sequelae. These sequelae are most variable and may consist of motor involvements such as pareses or paralyses, cerebellar symptoms, extrapyramidal symptoms, and finally typical behavior disturbances resembling the picture often seen following lethargic encephalitis. These patients become impatient, impulsive, undisciplined, disobedient, cruel, erotic, and often may require institutionalization.

Pathology—Autopsy reports of cases dead of postscarlatinal encephalitis are very rare and have been documented by Southard and Sims,[34] and Toomey, Dembo, and McConnell.[35] The pathologic lesions consist of vascular dilatation and rupture with extravasation of red cells. The primary brain damage seems to be vascular. Nerve cells are only secondarily affected around the hemorrhagic lesions.

Case 4—R. L., aged 16 years, had scarlet fever in November 1943. She recovered but never felt quite well afterwards although she could not say exactly why. She had fleeting joint pains (ankles, knees, wrists) for about a one-week period in December 1943, followed in January 1944 by more marked stuttering than usual for her, irritability, restlessness, insomnia, and increasingly severe purposeless choreiform movements. Early in February she developed chills and fever and was taken to University Hospitals where a diagnosis of pneumonia was made. She received chemotherapeutic treatment.

Physical examination revealed very large, noninflamed tonsils and a soft systolic murmur at the base of the heart. Neurologic findings consisted of a mild papillitis of optic disks, increased biceps reflexes on the right, increased triceps on the left, increased ankle jerk on right, a questionable Oppenheim sign on the right, and some choreiform movements of her hands. Her condition did not improve neurologically after three weeks' observation. Blood urine, serology, and sedimentation rate were negative. Spinal fluid was negative except for a sugar below 20.

The patient was anxious to get home and back to school. Her sensorium was clear. She appeared cheerful and somewhat giddy. Her stream of thought was unimpaired. She was pleasant and cooperative. She had a rather disheveled appearance. The Minnesota Multiphasic Personality Inventory showed an L score of 80, a peak of 73 on Hy, and D score of 63 with Pd 61. The Hunt Deterioration Test was negative. Her estimated I.Q. was 95-100.

RHEUMATIC FEVER

Since acute rheumatic fever is a general infection, it may involve all organs of the body including the brain (Swift,[36] Veil[37]). As a rule the cerebral manifestations of rheumatic fever are not considered an important part of the picture. However, reports of rheumatic fever, encephalitis, or cerebral rheumatism are not uncommon (Frisch,[38] Bruetsch[39]).

Clinical features—The cerebral manifestations in rheumatic fever may be so diversified that Trousseau[40] divided the clinical types into six varieties depending upon the predominance of symptoms: apoplectic, maniacal, meningitic, hydrocephalic, convulsive, and choreic.

The cerebral symptoms may occur at any time during the usual course of the disease or even late in convalescence. Usually the onset is during the second or third week of the illness while the patient is suffering from a typical attack of rheumatic fever with painful polyarthritis, malaise, chills, fever, and sweats. The first indication of cerebral involvement consists of restlessness, lack of attention, and mild visual and auditory hallucinations. This mild delirium may last from a few hours to a few days and is accompanied by an increase in the pulse rate and a sharp rise in temperature. The delirium increases in severity and the patient may present a typical picture of an acute delirious mania with extreme psychomotor activity, rapid exhaustion, and death. Frequently the period of overactivity suddenly passes to a lethargy and finally to a coma.

Throughout this severe illness the pulse remains very rapid, the temperature high, and the joints very sore. The cranial nerves seem uninvolved although an occasional transient squint and diplopia was reported by Coombs.[41] The deep reflexes become exaggerated and convulsions may rarely be present. When associated with a Sydenham's chorea, choreiform movements may constitute a prominent part of the illness. Rarely meningeal involvement oc-

curs with the presence of a Kernig sign and a stiff neck.

The prognosis in the illness is very grave, death usually occurring at the height of the illness after a brief interval of cerebral manifestations. If the patient survives, the temperature drops rapidly within a few hours and the coma or hyperactivity also recede within ten to twelve hours leaving the patient fairly quiet but still somewhat confused or incoherent for a few days.

Bruetsch[39, 42] in a series of papers described a progressive obliterating endarteritis as a late sequel of rheumatic fever. He felt that when this vascular process involves the small vessels, microscopic areas of infarction result, producing convulsive seizures or a variety of mental symptoms. This type of cerebral involvement has been termed by Bruetsch "rheumatic brain disease." The epileptic seizures make their first appearance from three weeks to eleven years after recovery from the rheumatic fever in patients who prior to the first attack of articular rheumatism did not have convulsions. This condition has been termed "rheumatic epilepsy." Bruetsch observed chronic rheumatic endocarditis in 4 per cent of patients dying of mental disease and in 9 per cent of schizophrenics. This high incidence suggested to him that the cerebral lesions could well be the causative factor in the precipitating of the mental illness.

Pathology—The autopsy findings have been described by Winkelman and Eckel,[43] and Bruetsch.[42] The cerebral alterations are not specific but are consistent with a diagnosis of encephalitis. The nerve cells show moderate change with some swelling, chromatolysis, neuronophagia, and satellitosis. In some areas the cells have entirely disappeared to produce "Verödungsherde" or areas of devastation. There is a mild focal and diffuse glial increase. The vessels show a productive endarteritis and some perivascular bleeding.

Case 5—P. J., 16-year-old female, developed a persistent upper respiratory infection in June 1944. A short time later the family doctor discovered a heart murmur which prompted him to make a diagnosis of rheumatic fever. Joint symptoms, although not severe, were limited to the ankles and arms and persisted for about a week. Following the doctor's instructions, a strict regimen of bed rest was rigidly adhered to and the doctor called regularly to observe and care for the patient. During the ensuing two months the patient remained in bed and presented a listless, disinterested appearance. Early in August she began to develop gross, thrashing, aimless, choreiform movements of her arms and legs. A short time after the development of these additional symptoms an appendectomy was performed and an acutely inflamed appendix was found. The recovery from this procedure was apparently complicated by slow wound healing, and typhoid or foreign protein fever therapy was administered.

Throughout the fall of 1944, the patient had a persistent low-grade fever, and the lethargic behavior was accompanied by a fear of dying or "fainting" due to a possible malfunctioning of her heart. This prompted a ten-day hospitalization period in November 1944 for complete physical examination. The patient was declared well and devoid of any active rheumatic fever. For a few days following her discharge from the hospital she had a remission in her listlessness, but she soon reverted back to her former behavior. She showed no interest in her friends and wished them not to visit her. Any attempt at resumption of her activities seemed to be defeated by her alleged physical weakness. She preferred to remain in bed all day.

A local osteopath called in on the case had moderate transitory success in getting the patient out of bed and resuming her activities. In spite of all efforts at treatment the patient's behavior continued to deviate more from normal. Whereas previously she had exhibited fairly good judgment, she now began to have episodes of poor judgment. At times she seemed to be in "trance-like" states. In February 1945, she had a four weeks' stay in a rest home under the care of a competent psychiatrist who administered a "nerve tonic" and gave her a series of six electric shock treatments. Upon her return home she began demanding more and more medical attention, and again slipped back into her lethargy. The demands led to conflicts between the father and the patient.

During her final hospital stay, the patient showed no improvement. She continued to be untidy, seclusive, and completely indifferent to other patients and toward activities. Her extreme apathy and listlessness were manifested by her desire to spend all day in bed. She was very polite, however, and was ever ready with her sweet, theatrical smile.

PERTUSSIS

THIS condition is one of the more common types of postinfectious encephalitis complicating contagious diseases of childhood.

Grenet and Mourrut[44] found convulsions occurring in nearly 10 of 238 cases of pertussis. Numerous theories have been advanced to explain the cerebral symptoms. Cannelli[45] thought they were secondary to minute hemorrhages resulting from the action of carbon dioxide on the blood vessels or an increase of ventricular pressure during paroxysms of coughing. Neubürger[46] suggested that air emboli from ruptured alveoli caused ischemic necrosis. Hiller and Grinker[47] felt that there were changes in the velocity of capillary blood flow to account for perivascular bleeding and necrosis of brain parenchyma.

Pathologic studies have strongly suggested that most of the cerebral findings are produced by the direct effect of the toxin from the causative organism. Encephalitic symptoms have been produced experimentally in animals by injecting the protein fraction of the pertussis bacillus. Grenet and Mourrut found cerebral complications more common in the cases which revealed otitis, pharyngitis, and pulmonary inflammations.

Symptomatology—Nervous manifestations are most common in the very young but may occur at any time during childhood. The onset which may be either gradual or sudden usually takes place after the peak of the paroxysm of coughing is reached and only rarely starts during the catarrhal stage. Convulsions are the most frequent of the nervous symptoms. They may be associated with coughing paroxysms or may occur independently. They are usually clonic and generalized but unilateral Jacksonian seizures sometimes occur. Coma occasionally follows and may be of long or short duration. The convulsions recur at intervals and the coma frequently becomes deeper and is accompanied by respiratory irregularities. A fever is almost always present. Vomiting is commonly present and may become projectile in character. Some cases manifest only mental apathy, loss of appetite, irritability, and restlessness. The child may complain of headache which later radiates to the back of the neck and is very often followed by signs of meningeal irritation.

Motor findings appear early during the course of the disease, the most common being a hemiplegia. However, monoplegias, paraplegias, and quadriplegias are also seen. The paralysis is flaccid at first and later becomes spastic. These paralyses may be temporary or result in permanent neurologic sequelae. The paralysis often sets in after a convulsive seizure but may develop gradually.

The involvement may be widely scattered manifesting findings of myelitis or neuritis. Tremors, facial tics, chorea, dysphagia, dysphonia, aphasia, athetosis, or ataxia may develop. Temporary or permanent amaurosis may occur and deafness has been observed. Sensory findings are rare.

Coma, delirium, and sleep disturbances occur frequently. Mental deficiency and symptomatic epilepsy occasionally appear as late sequelae. Schnute and Mallory[48] suggested that pertussis encephalitis may be an important cause for some cases of mental retardation heretofore not understood. Out of 85 cases which they studied they found a history of pertussis in 56 per cent and in many cases there was a history suggestive of encephalitis during the acute illness. Pertussis was found to rank second in frequency only to measles. Eley[49] reported 3 cases on which encephalographic studies were performed. One showed calcification which the author felt was secondary to an old cerebral hemorrhage. The other 2 cases revealed severe cortical atrophy and dilatation of the ventricles. The spinal fluid may be normal or may disclose a pleocytosis and an increased protein content. The mortality is highest in infancy; however, cases that are extremely severe clinically may result in complete recovery.

Pathology—Gross examination of the brain reveals congestion, edema, and scattered petechiae. The histologic picture varies considerably from case to case. The most frequent abnormality is a toxic alteration of the cortical ganglion cells (Husler and Spatz,[50] and Neubürger[46]). The neurons of the cortex, dentate

nucleus, and corpus striatum show tigrolysis and loss of all cytoplasmic topography. The cell nuclei, however, are intact with the exception of the vacuolated cells of the hippocampus which are completely degenerated. Cortical atrophy, gliosis, and a moderate hydrocephalus were reported by Ford.[51] Many cases contain perivascular lymphocytes throughout the corpus striatum and white substance.

Case 6—E. K., a 21-year-old female, was admitted to the hospital on October 4, 1944, for consideration of a therapeutic termination of her four-month pregnancy, since the latter had resulted in a pronounced aggravation of her convulsive disorder. At the age of one year there was a history of a very severe case of pertussis which persisted for over two months. During this illness there was a continuous fever fluctuating from 102 to 106° F. Without a remission she developed a loss of function of the extremities on the left and purposeless movement of the limbs on the right. Several generalized convulsive seizures occurred. She rapidly became more somnolent and remained comatose for almost three weeks. In a short time she made a relatively complete recovery; however, a pronounced disturbance of function persisted on the left upper and lower extremities.

She was able to start school at the usual age of 6 years. Although she worked hard at her studies, she received only fair marks; she did not fail in any of her subjects, however. At the age of 12 years she developed a more obvious learning difficulty and began to appear definitely dull in her studies. A short time later irregular purposeless movements reappeared in the limbs on the right. Recovery followed in a few weeks.

At the age of 13, shortly after the onset of menstruation, typical grand mal convulsive seizures developed. The convulsions occurred as frequently as six to eight times a day, but after a period of about one year they were partially controlled by anticonvulsants and occurred only once or twice a month. She continued to undergo a progressive intellectual deterioration which made it impossible for her to continue her work in the sophomore year of high school (age 18 years). At the age of 16 years her I.Q. was 65-70.

Although she had always been noticeably sensitive, she now became increasingly irritable with numerous outbursts of uncontrollable temper. At the age of 21 years she became almost impossible to manage. She began to smoke, drink to excess, and manifest sexual promiscuity. On one escapade she stayed away over night with a married man giving the excuse that her parents did not treat her right. She lost interest in her dress, appearance, religion, and all of her former hobbies. In June 1944, she missed her first menstrual period and later was found to be illegitimately pregnant. The epileptiform seizures rapidly increased in frequency, and she became extremely irascible. At times she was assaultive and homicidal. There was also a concomitant depressive reaction. On one occasion she made an abortive suicidal attempt. Despite anticonvulsant drugs the convulsions continued at frequent rate.

DISCUSSION

Certain features of these postinfectious encephalitides might be considered. Of all the infectious diseases of childhood, measles and whooping cough probably produce the greatest number of postencephalitic complications. Chickenpox often is accompanied by a fairly severe encephalitis which generally subsides and leaves very little permanent brain damage. Actually there is no correlation between the severity of the infectious disease and the cerebral involvement. In many cases with only a mild illness severe postencephalitic complications may arise months or even years later. It is in these cases that the etiologic significance of the infectious disease is entirely overlooked. It is imperative that a detailed infectious disease history be elicited in any patient with a behavior disturbance. It is surprising how often such a history will reveal the possible causative factors in the patient's illness. It should also be kept in mind that the encephalitic component to any infectious disease may precede, accompany, or even follow the actual illness.

In reviewing the statistics it might appear that the encephalitic complications in the infectious diseases are very uncommon and therefore do not comprise any real problem. It is true that less than 0.5 per cent of the infectious diseases are accompanied by a recognizable form of encephalitis. However, when one considers the tremendous number of individuals who have infectious diseases, probably well over 280 million cases in this country, then even 0.5 per cent becomes a large number and can create a definite problem as regards postencephalitic sequelae. It is true that at present we know of no way to prevent such residuals, but one can caution against an indifferent attitude toward these illnesses. It might well be of value to treat them with more respect and to avoid infection by every means possible.

CONCLUSIONS

1. Social and environmental factors do not adequately explain many of the behavior disturbances occurring in children.

2. The unrecognized cerebral complications of the childhood infectious diseases may well account for the sudden appearance of personality alterations in children.

3. The nervous system involvement in the various infectious diseases is reviewed.

4. It is suggested that more attention be given to the possible brain damage in the infectious diseases and that such illnesses be taken less lightly by physicians and parents.

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Diagnosis and Operability of Pulmonary Cancer

ALBERT BEHREND*

PHILADELPHIA, PENNSYLVANIA

THE IMPORTANCE of early diagnosis in the treatment of cancer has been stressed repeatedly. The signs and symptoms of early malignancy in other parts of the body are probably more familiar than they are in the lungs, for it is only in the last fifteen years that it has been possible to treat cancer of the lung successfully. Improvements in preoperative preparation, anesthesia, surgical technic, and postoperative care have brought the mortality rate of operations for cancer of the lung within the reasonable limits of 6 to 10 per cent. The great obstacle in the cure of pulmonary cancers lies in the fact that almost 50 per cent of cases are seen by the surgeon when all possibility of benefit from surgery has passed. Cancer of the lung is very frequently insidious in its onset and often the signs and symptoms are misinterpreted by both patient and physician.

Pulmonary cancer ranks as the second most common site of cancer today. Hence, it is necessary to maintain a high incidence of suspicion when a patient gives the history of a cough for which there is no obvious cause. Too often these are called "cigarette coughs." The cough may be dry or it may be productive of sputum. The sputum may vary from a colorless phlegm to a more or less copious purulent secretion. Blood streaking or hemoptysis may be the first indication to the patient that all is not well, but more often hemoptysis is a later symptom.

A history of pneumonia in a patient past 50 years of age should be viewed with suspicion, and when there have been recurrent attacks of pneumonia over a period of twelve or fifteen months, it is almost certain that there is an underlying basis for the pneumonitis. Unresolved pneumonia or pneumonias whose physical signs disappear slowly should also be suspected of coexisting cancer. Not uncommonly, patients are seen who have had a recent diagnosis of bronchiectasis or lung abscess which has improved under care only to recur.

With the advent of penicillin, streptomycin, and sulfa drugs it has become increasingly easy for the general practitioner to treat these cases successfully in the home and to obtain apparent clinical cure. In every case of this character patients should be referred for a roentgenologic examination of the chest after recovery even though physical examination reveals that the signs of disease have entirely disappeared. Even with this precaution we fear that many cases of pulmonary carcinoma will be missed unless one forms the habit of having an x-ray examination of the chest performed yearly.

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Although many of the cases that we see have symptoms for only a few weeks prior to consultation with family physician or surgeon, subsequent operative findings impress us with the fact that the lesion must have been present for months before the symptoms became sufficiently severe to alarm the patient. When the x-ray discloses a suspicious lesion in the lung fields, bronchosocopy and exploratory thoracotomy are indicated. It is important to understand that the risk of exploratory thoracotomy today is no greater than the risk of abdominal exploration. Too often one hears the statement, "He's got something in that lung. Let's watch it for a while." In the time that the lesion is watched it may become inoperable or by extension cause complications which make operation more hazardous than before.

Although the x-ray is important in the diagnosis of pulmonary cancers, much can be learned from physical examination. Obvious weight loss, clubbing of the fingers, and lag on deep inspiration may be noted on the affected side. Pain on pressure over the localized area may be present in cases of pulmonary carcinoma where the pleura is affected by an accompanying pleuritis. Supraclavicular and cervical lymph nodes should be examined for evidence of enlargement. Percussion dullness is a common finding in those portions of the lung which have become atelectatic as a result of bronchial obstruction. Breath sounds may be altered as a result of bronchial obstruction causing localized areas of pulmonary consolidation.

Sputum examination must be carefully performed in every case when it is obtainable. Sputum should be examined for tubercle bacilli. The finding of a positive sputum will not in itself rule out carcinoma when other findings are suggestive, for we have found carcinoma and pulmonary tuberculosis in the same patient on more than one occasion. It is also desirable that the sputum be examined for carcinoma cells by the Papanicolaou technic.

Bronchoscopic examination should be carried out in every case of suspicious x-ray findings. When the lesion is near the periphery of the lung, tissue is seldom obtainable, but, by aspiration of bronchial secretions, sufficient cells may be obtained to establish a diagnosis either by using the Papanicolaou method or by fixing the cells in paraffin. If no cancer cells are obtained by bronchoscopic examination it should not be inferred that cancer is not present, for in only about 40 per cent of operated cases has a positive cell block been obtained by bronchoscopic examination.

We have been loath to use the needle biopsy method of obtaining tissue for diagnosis. This can be done rather accurately under fluoroscopic guidance, and we have never encountered any ill effect from it. However, the method has now been abandoned because of scattered reports of thoracic empyema complicating such a procedure. Another objection to the method is that cancer cells may be seeded along the path of needle puncture.

ONCE the diagnosis of pulmonary carcinoma has been established on the basis of biopsy, bronchoscopic aspiration, or sputum examination, or, if the diagnosis must be a presumptive one, simply on the basis of history, physical examination, and x-ray findings, the question arises as to whether or not the tumor is operable. Duration of symptoms may or may not be important, for in some cases far advanced tumors are discovered which have been relatively asymptomatic, whereas in other instances small tumors are discovered which appear to have been present only a short time. Symptoms and physical signs depend a great deal upon where the growth is located and how completely it may block a bronchus.

Hemoptysis may occur early or late, but it is one symptom which commonly causes the patient to seek medical aid. Hemoptysis does not in itself indicate that the growth is inoperable. The size of the tumor is also no indication of operability. Large tumors may be slow-growing and slow to metastasize, whereas small tumors may be found to have metastasized to adjacent structures or distant ones. Of much greater importance than size is the type of tumor encountered.

Adenomas occur mostly in young women, and many of them may be treated by fulguration through the bronchoscope. It has now been definitely established that these adenomas may undergo malignant change so that pneumonectomy is advised if they recur after bronchoscopic treatment. The adenocarcinomas are the most favorable of the cancers for removal and the end results are best in this type of growth. The worst prognosis is obtained when the tumor is of the oat cell or undifferentiated type; the squamous cell type of tumor lies somewhere between the other two as regards operability and prognosis.

Demonstrable metastasis of a pulmonary tumor to cervical glands, skull, or other distant parts of the body are evidence of inoperability. Metastasis to adjacent structures, such as hilum lymph nodes or pericardium, does not render the case inoperable, but makes the prognosis for cure graver. Some excellent results have been reported in the removal of lobes of the lungs containing solitary pulmonary metastasis from cancers previously removed elsewhere in other parts of the body. If it can be demonstrated that such metastases are in fact solitary, removal of the affected lobe should be considered. The finding of bloody fluid in the pleural cavity denotes that the tumor is inoperable, as do cancer cells in the pleural effusion. Involvement of the recurrent laryngeal nerve usually renders the tumor inoperable. However, Ochsner has reported a case with involvement of the nerve who survived several years after removal of the tumor and of the lymph nodes which were compressing the nerve.

The question of operability or inoperability can rarely be decided by x-ray examination, fluoroscopic study, or bronchoscopy alone. In every doubtful case a thoracotomy should be performed. Occasionally, tumors of the lung are missed because they lie behind the heart or they are confused with mediastinal markings.

Lung abscess is a frequent finding in cases of pulmonary carcinoma, and indeed the first symptoms may be those of abscess. Abscess occurs as a result of blockage of a bronchus by the enlarging tumor and of interference with blood supply to a localized area of the lung tissue. The risk of operation in these cases is increased, for lung abscess is always complicated by some degree of pleuritis which renders the lung adherent to the pleura. When the abscess cavity reaches the periphery of the lung, it is difficult to avoid breaking into the abscess at operation, thereby causing an infection of the pleural cavity. Danger of hemorrhage from lung and pleura is also greatly increased. A large abscess may render a pulmonary cancer inoperable, but smaller abscesses do not seriously hinder operation. Several cases will be summarized which are illustrative.

The first case is that of a man, age 62 years, who was admitted to the Jewish Hospital on January 11, 1947. His chief complaint was cough. He was well until November 1946, when he developed a productive cough, pain in the chest, and rusty sputum. He was treated at home for pneumonia by means of sulfa therapy and his condition improved. However,

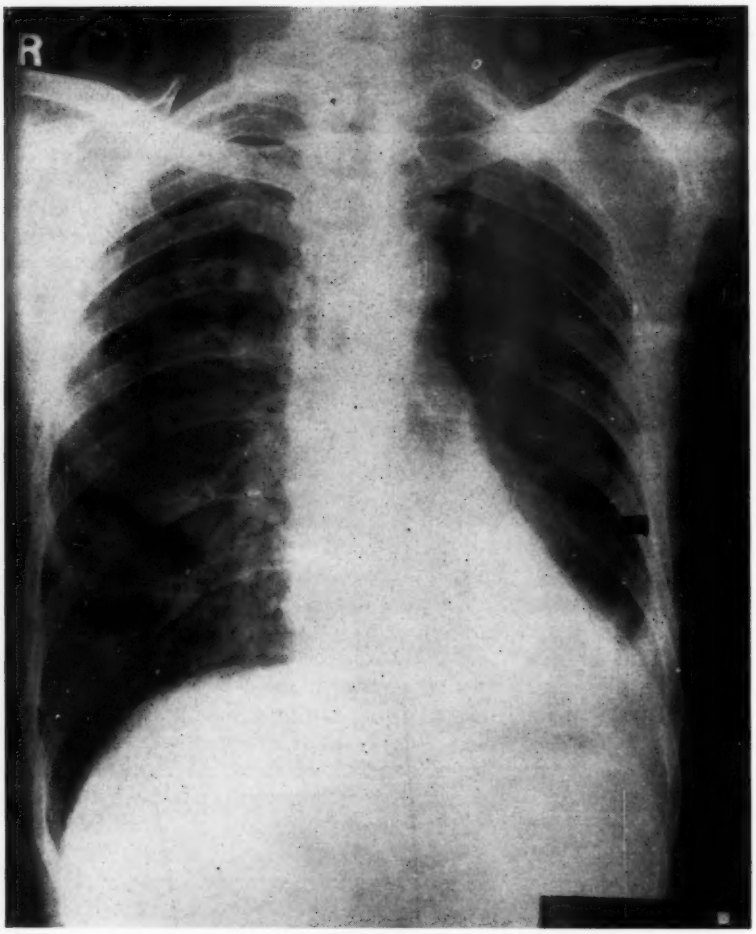

Figure 1. Routine chest x-ray made on admission to the hospital. Left lower lobe segmental atelectasis is present. Note the moderate shift of the heart to the left.

he continued to cough. The sputum was foul and had continued to increase. He had lost 10 pounds since the onset of his illness and had two or three night sweats daily. His past history and social history were not significant. Physical examination revealed the heart shifted to the right side and impaired percussion at the right base. X-ray examination was carried out after admission to the hospital and a suppurative pneumonitis was found at the right apex. Follow-up examination one week later suggested that bronchogenic carcinoma be ruled out in view of the slow resolution of the process. Secretions were aspirated through the bronchoscope on the fifteenth of January, but no carcinoma was found in these secretions.

Operation was advised, but because of clinical improvement the patient left the hospital. Improvement was temporary and he returned May 1, 1947, having lost 15 pounds in weight. Sputum was profuse and temperature showed daily spiking. Exploratory operation was performed May 8, 1947, and at this time the tumor was found to be inoperable because of extension

Figure 2. The results of bronchography with lipiodol. The arrow points to the area of bronchial constriction in the lower lobe bronchus.

to hilum structures and because of a very large adherent abscess cavity which was thin-walled and was promptly entered shortly after the pleura was opened. The abscess cavity was drained, but the lung could not be removed.

The patient in the second case was a man, 62 years old. He was admitted to the Jewish Hospital January 2, 1947. His chief complaint was cough and hemoptysis. He had had pneumonia in 1945 with rusty sputum, chills, fever, and pain in the left chest. He was in bed for several weeks but recovered. No x-ray examinations were made at that time. He had another attack of pneumonia in the summer of 1946 which was similar to the first except that after the second attack of pneumonia he did not regain his health. Cough and expectoration continued and the sputum was occasionally tinged with blood. Physical examination revealed a loss of 30 pounds in weight and clubbing of the fingers. Fremitus and breath sounds were increased at the left upper lobe and râles were noted at the left base. X-ray examination showed a left lower lobe segmental atelectasis due to bronchogenic carcinoma. Bronchoscopic examination obtained no tissue.

Figure 3. Secretion cell block showed endobronchial evidence of carcinoma in the peribronchial lymph nodes, chiefly adenocarcinoma type.

However, carcinoma cells were found in the secretion aspirated at this time. A left pneumonectomy was performed January 11, 1947. The patient was discharged from the hospital two weeks later. (See Figures 1 and 2.)

THE third case, a man age 59, was admitted to the Jewish Hospital April 21, 1947. The chief complaint was pain in the chest. This was substernal and had been noted from six to eight months before admission. Three months before admission a chest x-ray failed to show a tumor. A somewhat similar pain had been noted for the past ten years and had been relieved by nitroglycerine. However, the substernal pressure of the past six months was accompanied by a cough which had heretofore not been present. Sputum was raised with the cough. Three weeks before admission it became blood-streaked, and for two weeks before admission the patient had noted intermittent hoarseness. Physical examination of the chest showed a marked degree of emphysema. Otherwise, abnormal physical signs were remarkably lacking.

A bronchoscopy performed in the hospital showed compression and rigidity of the left main bronchus, and examination of aspirated secretion was reported as suspicious of carcinoma. An x-ray examination made at the same time demonstrated a possible bronchogenic carcinoma. Exploratory thoracotomy was performed on May 19. A large tumor in the hilum area was readily exposed. This had extended to involve hilum lymph nodes and there was a confluent mass of these which extended into the arch of the aorta and was densely adherent to the aorta, rendering the mass inoperable. The incision was closed and the patient was discharged from the hospital two weeks after the operation.

The fourth case is that of a 56-year-old man who was admitted to the Jewish Hospital October 3, 1945. His chief complaint was a dry cough of two months' duration; no hemoptysis had been noted. The patient had lost from 10 to 15 pounds in weight despite the fact that he had a good appetite. An x-ray examination performed elsewhere prior to admission showed a possible carcinoma of the left lung and this was confirmed by planigraphic studies at this hospital. Physical examination of the chest was normal. Bronchoscopy was performed October 8, and secretion was aspirated from the left bronchus, though no tumor tissue could be obtained. Pathologic report showed carcinoma cells in the secretion. Operation was performed October 11, 1945. A left pneumonectomy was performed. The patient died eighteen months later from a cerebral accident which suggested a stroke though death may have been due to metastasis.

In the last case, the patient was a woman, 56 years old, who was admitted to the hospital November 24, 1946. Her chief complaint was a cough, which had been present since September 1946. It was especially severe at night and had recently been accompanied by blood-tinged sputum. Physical examination revealed dullness to percussion and diminution of breath

sounds over the right lower lobe. X-ray examination disclosed a segmental atelectasis in the hilum area of right lung, suggesting obstruction due to carcinoma. Bronchoscopy revealed no evidence of a tumor and insufficient material was obtained for pathologic examination. A right pneumonectomy was performed December 3, 1947 for bronchogenic carcinoma. Empyema developed ten days postoperatively and necessitated intercostal tube drainage. To date there has been no evidence of recurrent carcinoma. (See Figure 3.)

In summary, it must be repeated that the successful treatment of pulmonary carcinoma is dependent on an early diagnosis. Yearly routine chest surveys will help attain this goal. Prompt investigation of persistent chest pain, cough, sputum, and hemoptysis in persons previously unaffected by such symptoms is imperative. Unresolved pneumonia and lung abscess should be viewed witn suspicion until it can be shown that carcinoma is not present. Investigation of these cases requires the fullest cooperation of the general practitioner, internist, surgeon, bronchologist, roentgenologist, and pathologist. Determination of operability depends on many factors including the type and size of tumor, its location, the presence of metastasis or spread to adjacent organs, and degree of complicating pulmonary infection.

Medical Management of Whooping Cough in Infants

JEROME L. KOHN AND ALFRED E. FISCHER

NEW YORK CITY

In the last decade many advances have been made in both the prophylaxis and treatment of the communicable diseases of childhood. As a result, the mortality from diphtheria, scarlet fever, and measles is now very low. Whooping cough, on the contrary, still has an appreciable morbidity and mortality, especially during the first year of life.

Unlike most of the other communicable diseases, there is very little or no immunity to whooping cough at birth. Since, in most instances, whooping cough is not suspected in young infants, they are rarely admitted to a hospital before the paroxysmal stage. These infants often come from families of low economic status and are admitted exhausted, suffering from malnutrition, and in poor general physical condition.

The diagnosis sometimes could be made bacteriologically by means of a cough plate or a culture taken from the nasopharynx when a clinical diagnosis was in doubt. We found the nasopharyngeal method of culture more satisfactory than the cough plate method. The culture was taken by passing a fine metal applicator with a sterile cotton swab into the nasopharynx, as described by Brooks, Bradford, and Berry, and was grown according to the method described by Bullowa, Buxbaum, and Scheinblum. In a recent series, positive cultures were obtained for 80 per cent of the children some time during their illness. Blood counts often were helpful in establishing a diagnosis. In whooping cough a leukocytosis is frequently found. Some children had a total white blood cell count of 100,000 or over, and there was one child whose total leukocyte count was 240,000. A high cell count had no prognostic significance.

Roentgenograms of the chest were made if there was any question of pneumonia or atelectasis. Roentgenograms, taken in the lateral and oblique positions, at times gave valuable information by demonstrating areas of density in the absence of physical signs of pulmonary involvement, and sometimes in the absence of fever.

Recently Felton and others have used a new skin-testing material, known as pertussis agglutinogen for the detection of susceptibility to whooping cough. In our experience, this is the first skin-testing material that has been a dependable indicator of immunity. The skin test becomes positive about three weeks after the onset of illness. It is more likely to be positive in older children. However, in young infants the test was often negative in undoubted whooping cough. We have employed this test

From the Willard Parker Hospital, Department of Hospitals, New York City.

on more than 200 persons. Our data also indicate that a negative reaction occurs in some individuals who are apparently immune, such as hospital personnel in the wards. Sauer and Markley stated that their data seemed to show that the agglutinogen skin test was a reliable index of vaccine-induced immunity.

The clinical picture of an infant seriously ill with whooping cough during the paroxysmal stage is well known. There are frequent exhausting paroxysms and moderate cyanosis. The infant sleeps very little, vomits frequently, and becomes exhausted. At this stage of the illness the trachea, bronchi, and bronchioles frequently contain a sticky, tenacious, viscous secretion which often becomes inspissated. Older children are able to cough up these tenacious plugs after a severe paroxysm. However, there are infants who are unable to expel the secretions. Such infants often can be saved with appropriate therapy.

At the Willard Parker Hospital in New York, 4,257 patients were treated for whooping cough during the years 1940 to 1946, inclusive. Of these, 1,008 were infants, 534 of them under 6 months of age and 474 between 6 and 12 months old (Table 1).

JEROME L. KOHN

It is the purpose of this paper to describe several procedures which we believe have had a favorable influence on the course of whooping cough, with special emphasis on the care of infants and young children. By using the method of treatment to be described the mortality of infants under 1 year at the Willard Parker Hospital has decreased from 6.7 per cent in 1941 to less than 1 per cent in 1946. In children over 2 years of age the mortality rate usually was less than 1 per cent. Older children admitted to a hospital are more likely to have cerebral or pulmonary complications than are those kept at home.

In our experience one or all of the following are essential in the care of the infant ill with whooping cough: (1) an experienced medical and nursing personnel, (2) oxygen, (3) aspiration of the upper respiratory tract, (4) sulfonamides and penicillin, (5) hydration and parenteral therapy, (6) special feeding technic, (7) the use of hyperimmune serum.

Nursing—It is axiomatic that good nursing is essential in the recovery from any serious illness; this is especially true in whooping cough. The seriously ill infant never should be left unattended, for the onset of a paroxysm may be sudden and unexpected. The nurse must be schooled in the use of all mechanical lifesaving measures. Prompt and correct judgment as to procedure might be a lifesaving measure.

Oxygen therapy—Oxygen is believed by us to be the most valuable therapeutic aid, for all severely ill infants and young children have some degree of anoxia. This anoxia is mainly due to (1) the character of the mucoid secretion plugging part of the bronchial tree, causing varying degree of atelectasis; (2) extensive pulmonary involvement with or without atelectasis, and (3) frequent long, exhausting paroxysms.

ALFRED E. FISCHER

It was our practice to place every young infant, on admission, in an oxygen tent or in a hood. The hood was made of a transparent plastic material and was placed over the infant's head. This type of hood was of particular value since the oxygen could be kept at a high level and the oxygen content could be brought back quickly to the desired concentration when the hood was replaced following its temporary removal. It also made the general care of the infant much simpler; for example, when intravenous therapy was necessary, arm or leg veins were accessible without disturbing the oxygen hood.

The duration of the oxygen therapy was determined by the general condition of the child, and also by the clinical evidence of extensive pneumonia and atelectasis. The period of oxygen therapy varied from twenty-four hours to six weeks.

Children who have had exhausting paroxysms without evidence of pneumonic infiltration were often relieved when placed in this high oxygen atmosphere. The atmosphere of the oxygen tent acted as a sedative, the child fell asleep, and the paroxysms became less prolonged and exhausting.

The temperature of the tent or hood was kept at about 68° F., and humidity close to 40 per cent. Lower temperatures seemed to stimulate respiration and increased the number of paroxysms. The oxygen concentration was about 50 per cent. The oxygen tent was found superior to facial masks or nasal catheters, since these devices often frightened the child. They were used only in emergencies when an oxygen tent was not available.

Oxygen therapy also proved to be a valuable aid in those children who had convulsions. Many such patients were relieved quickly and were kept in oxygen tents until there was no further evidence of cerebral irritability. The removal of some spinal fluid usually was not effective. Occasionally, upon recovery, these infants showed evidence of permanent cerebral injury such as spasticity of the extremities, hemiplegia, or mental retardation. Dolgopol stated that these convulsions were the result of prolonged anoxia or brain hemorrhage.

Aspiration—The trachea and bronchi often contained a thick tenacious secretion. In order that the oxygen could reach the bronchial tree, suction was applied to the pharynx and trachea of every infant with any signs of obstruction. Frequent change of the infant's position in the crib also was helpful in preventing stagnation of the secretions.

In severely ill infants, a standard electrically driven aspiration apparatus was kept at the bedside. A soft rubber catheter with multiple perforations for about 2 inches above the tip was used. The tip was not perforated. A No. 12 French-sized catheter was used for the oral route and a No. 10 for the nasal route. During a severe paroxysm the child was placed in the sitting position with the head held forward, the forehead supported and pharyngeal suction applied. This was repeated as often as necessary. If a suction apparatus was not immediate-

TABLE 1

THE INCIDENCE AND MORTALITY OF WHOOPING COUGH AT THE WILLARD PARKER HOSPITAL

Age	1940			1941			1942			1943		
	Number of Patients	Deaths	Mortality, Per Cent	Number of Patients	Deaths	Mortality, Per Cent	Number of Patients	Deaths	Mortality, Per Cent	Number of Patients	Deaths	Mortality, Per Cent
0-6 months	47	6	12.0	50	3	6.0	128	10	8.0	64	4	6.3
6-12 months	42	..	...	51	2	4.0	127	3	2.4	50	3	6.0
1-2 years	74	..	...	138	1	0.7	244	3	1.2	120	3	2.3
2+ years	266	2	0.7	359	2	0.77	576	..	..	229	3	1.3
Totals	429	8	1.8	598	8	1.3	1,075	16	1.4	463	13	2.8

Age	1944			1945			1946		
	Number of Patients	Deaths	Mortality, Per Cent	Number of Patients	Deaths	Mortality, Per Cent	Number of Patients	Deaths	Mortality, Per Cent
0-6 months	55	1	1.8	121	6	5.0	67	0	..
6-12 months	49	4	8.1	103	2	2.0	52	1	1.9
1-2 years	105	1	0.9	191	4	2.1	84	1	1.2
2+ years	217	1	0.5	443	1	0.2	200	0	..
Totals	426	7	1.6	858	13	1.5	403	2	

ly available, suspension of the infant by the legs for a short period often gave temporary relief. Exudate drained from the nose and from the mouth when the patient was held in that position.

OCCASIONALLY the obstruction was so complete that the infant stopped breathing. When this occurred, the child immediately was removed from the tent and placed on a stretcher or table and the larynx and trachea were aspirated. Manual resuscitation using the pressure and release method was employed by a second person. During this procedure oxygen, or oxygen with 5 per cent carbon dioxide, was administered through a funnel kept close to the mouth. When the child again breathed regularly he was returned to the tent. Following such procedures the child was under constant surveillance. In cases with milder symptoms these heroic measures are not necessary.

Medical therapy—It has been our impression that the time-honored cough mixtures which contained expectorants and antispasmodics were of limited value in the relief of symptoms. We have not utilized any of these mixtures for a number of years. Cough mixtures may produce additional secretions. Occasionally one of the barbiturates was given. Sulfadiazine and penicillin are without clinical effect in uncomplicated whooping cough. However, these drugs were prescribed for the patients who had pulmonary or otitic complications. It was our impression that when a mixed infection with H. pertussis and one of the pyogenic cocci was present, considerable improvement could be expected when sulfadiazine and penicillin were employed. However, the clinical symptoms and signs of pneumonia sometimes persisted. It is known that extensive pneumonia with whooping cough can be caused solely by H. pertussis.

A study is now under way with the cooperation of Drs. Manfred Weichsel and Lewis Wanamaker to determine the value of streptomycin. To date about 100 infants have been treated by intramuscular injection, nasal drops, or aerosol inhalation. During this study serum was given to only 7 infants. Although the data have not been analyzed, we feel justified in stating that the drug merits further trial.

Parenteral therapy—Many infants were admitted in a state of severe dehydration. It must be remembered that some of these infants had been vomiting for days. Therefore, as soon as practical after admission, these children received parenteral fluids, whole blood plasma, glucose, and saline solution. If a child was ad-

mitted in ketosis or alkalosis, the appropriate solutions were administered until a normal electrolyte balance was restored. Parenteral therapy was continued as long as indicated by the clinical course of the disease.

TABLE 2

NUMBER OF ADMISSIONS FOR WHOOPING COUGH AND NUMBER OF CHILDREN RECEIVING HUMAN AND RABBIT SERUM, NOVEMBER 1944 TO JUNE 1945

Age	Total Admissions	Number Receiving Human Serum	Number Receiving Rabbit Serum	Deaths
0-1 year	120	79	2	1
1-2 years	127	30	7	2
2+ years	263	43	40	1
Totals	510	152	49	4

Feeding—We found it important to use a special technic in the feeding of severely ill infants and young children. There was always danger of food aspiration during or following a paroxysm. Infants were fed frequently and in small amounts. In those infants in whom there was evidence of accumulation of mucus in the upper respiratory tract, pharyngeal aspiration was instituted before the feeding. When the child became exhausted and had difficulty in sucking, fluids were given with a medicine dropper. Gavage feeding was administered only to extremely weak and exhausted infants, and was avoided whenever possible since the passage of the tube often initiated a paroxysm followed by emesis.

The infant was always fed in a reclining position in the nurse's arms, with his head elevated. After feeding, if the infant had a nasal or pharyngeal mucus accumulation, it was placed on its side and suction was applied through the nose. It was an inviolable rule that a nurse was never to leave the baby during the feeding. When a child had a severe paroxysm and vomited soon after feeding, he was placed in a sitting position and the head held forward. If there was no immediate relief, pharyngeal aspiration was used. On the above feeding routine, many seriously ill children gained weight during their hospital stay.

Serum therapy—From November 1944 to June of 1945, inclusive, human hyperimmune serum was used intensively. There were 120 children under 1 year of age, 79 of whom received serum. Twenty-one were given a lyophilized serum, and 58 a concentrated globulin fraction prepared from hyperimmune serum (Table 2). Thirty-three, or 44 per cent, of the children receiving serum had evidence of pneumonic infiltration.

Since a similar response was obtained with the lyophilized serum and the concentrated human globulin, the results were considered together. Three doses of serum were given intramuscularly to each patient, those severely ill receiving serum on three successive days, the remainder every second day. In desperately ill patients 60 cc. of the serum was given slowly by intravenous drip, and was repeated the next day by the intramuscular route.

Nurses and physicians made daily notes. A good therapeutic result was recorded when the patient showed a decided decrease in coughing in a short time. Improvement was noted in 70 of the 79 infants receiving sera (Table 3). The serum did not seem to be as effective in older children. The reason for this is not clear. Perhaps we should have used much larger doses in the older group.

A decrease in paroxysms was noted sooner than in the previous years when serum therapy was not used. Emesis was less frequent. The nurses stated that during the months when serum was being administered intensely "the ward was quieter during both the day and night." During the period of intensive serum therapy there was only 1 death in an infant under 1 year of age. In some patients the improvement after the use of serum was only temporary, and after five or six days it was necessary to give additional injections of serum.

A rabbit serum was given to 49 children. This was a refined concentrated globulin fraction obtained from rabbits who had been given repeated inoculations of killed cultures of H. pertussis (Phase I). The serum also contained a pertussis endotoxoid. The therapeutic response

was not as good as that following the injection of human serum. Therefore, it was given only to older children.

The disappearance of H. pertussis from the nasopharynx following serum therapy bore no relation to the clinical course of the illness. In some instances H. pertussis was obtained from the nasopharynx six weeks after the onset of symptoms (Table 4).

As has been stated, whooping cough was much less likely to be serious in the older age group. In this latter group the same general therapeutic principles were utilized. Since older children were able to cough up the thick tenacious mucoid secretion, suction seldom was necessary. Oxygen therapy was given when extensive pulmonary involvement was present. It was of special value when a child was having frequent prolonged exhausting paroxysms. The oxygen, plus the control of the moisture and temperature in the tent, acted as a sedative. We have already mentioned the value of oxygen during and following convulsions.

TABLE 3
RESULTS OF SERUM THERAPY FOR WHOOPING COUGH

AGE	CONDITION ON ADMISSION			SUBSEQUENT COURSE			
	Mild	Moderate	Severe	Improved	Unchanged	Worse	Died
	Human Hyperimmune Serum						
0–6 Mos.	10	10	21	38	2	0	1
6–12 Mos.	14	13	11	32	6	0	0
1–2 Yrs.	8	6	16	20	7	1	2
2–3 Yrs.	9	4	3	11	5	0	0
3+ Yrs.	10	13	4	18	8	0	1
	Rabbit Serum						
0–1 Yr.	2	0	0	0	2	0	0
1–2 Yrs.	4	3	0	1	5	1	0
3+ Yrs.	5	3	1	4	4	1	0
2–3 Yrs.	9	12	10	10	16	5	0

If the child vomited frequently, food was given in small amounts at short intervals, and repeated if the patient vomited. Cough mixtures were not used. When a child was unable to obtain sufficient sleep and was exhausted, one of the phenobarbitals was given. Hyperimmune serum was given only to those severely ill. As already mentioned, the serum seemed to be more effective in the younger age group.

TABLE 4
RELATION OF SERUM ADMINISTRATION AND PERSISTENCE OF H. PERTUSSIS

Serum Used	Total number treated	Negative throughout	Positive before serum	Negative on discharge	Positive on discharge
None	28	8	20	16	4
Human	64	17	47	21	26
Rabbit	36	9	27	12	10*

*On 5 of these patients no culture was made on discharge.

TWO ILLUSTRATIVE CASES

The first case is that of a girl aged 4½ months, who was admitted November 11, 1944, with a history of a cough of two weeks' duration. On admission the child was seriously ill and was having severe paroxysms. She had dyspnea and cyanosis, and had signs of bilateral pneumonia. Soon after admission the child had a convulsion, and the temperature receded somewhat. However, a temperature of 104° to 106° F. (40° to 41° C.) persisted for five days. She also received 3 doses of hyperimmune lyophil serum on successive days. Mucus secretions were removed frequently by aspiration. Roentgenographic examination of the chest at this time showed extensive consolidation of the upper lobe of the right lung. There was little improvement for the first four weeks. She received sulfadiazine for three weeks without apparent benefit. Then penicillin was started and was given for six days, during which period the patient began to improve. She was kept in the oxygen tent for five weeks.

The child was discharged from the hospital two months after admission. At the time of discharge a roentgenogram of the lungs showed complete resolution.

IN THE second case, the patient, an infant girl, had a history of cough for ten days. During the last three days before admission the cough had become more frequent and was paroxysmal

in character. About six hours before admission to the Willard Parker Hospital, the child had a generalized convulsion of fifteen minutes' duration. There were several subsequent seizures, and the child was seen at home during one of them. She was breathing rapidly and was moderately cyanotic. Auscultation of the chest gave evidence of fluid in the trachea and in the large and small bronchi. Little air was reaching the alveoli. The child was suspended by her legs, and a large amount of thick tenacious mucoid fluid exuded from the nose and mouth. She obtained relief from this procedure, and the breathing became less noisy, and the cyanosis lessened.

The child immediately was transferred to the hospital. The pharynx and larynx were aspirated and the patient was placed in an oxygen tent, where she soon fell asleep. She was given fluid subcutaneously and intravenously. Pharyngeal aspiration was repeated frequently during the first forty-eight hours. Oxygen therapy was discontinued after thirty-six hours. There were no convulsions after admission. Cerebrospinal fluid showed no abnormalities.

For about twenty-four hours the patient was lethargic. This lethargy diminished slowly, and she reacted normally to her environment after five days.

The child's temperature on admission was 105° F. (40.5° C.), but fell to normal after forty-eight hours. A roentgenogram of the chest showed no abnormality. The blood count was 19,000 white cells per cubic millimeter, with 76 per cent lymphocytic cells.

The infant received 200,000 units of sodium penicillin subcutaneously daily for seven days, and 3 intramuscular injections of hyperimmune human pertussis serum, 20 cc. being given on alternate days after admission to the hospital.

Three weeks after admission the patient was discharged in good physical condition.

CONCLUSION

In conclusion, we believe that the improved medical procedures and nursing care described have had a favorable influence on the course and outcome of whooping cough in infancy. Our results suggest that human hyperimmune serum or concentrated human globulin should be used in all infants who are seriously ill with whooping cough.

RADCLIFFE ANNOUNCES FELLOWSHIP

ANNOUNCEMENT has been made by Radcliffe College that applications are invited for the Helen Putnam Fellowship for Advanced Research, which is open to postdoctoral fellows in the field of genetics or of mental health. The fellowship covers an allowance of $2,600 per year and may be renewed. Further information and application blanks are obtainable from the secretary of the Graduate School, Radcliffe College, Cambridge, Massachusetts. Completed applications should be returned not later than April 1, 1949.

Ultraviolet Air Disinfection

WILLIAM T. ANDERSON, JR.*

NEWARK

THE CONCEPTION of air-borne infection appears to have preceded by some thousands of years the discovery of bacteria and virus. The ancients were familiar with epidemic disease. Those afflicted were kept in separate shelters or were forbidden to habitation. The word "toxin," the arrow flying in the darkness, has brought from the Old Testament the conception of an infection striking through the air. The idea of burning sulfur in rooms recently occupied by victims of a plague originated in the Orient at some distant time.

Just as some forms of bacteria have become adapted to an aquatic mode of transportation, it is to be expected that others may use the aerial route. Favorite modes of air travel are upon dust particles, droplets, and in tiny nuclei. The first two methods are for relatively short periods because they have a rapid settling rate. The nuclei have been known to remain aloft for days.

The majority of these air-borne organisms are nonpathogenic. Some of the microorganisms are spores which infect food products and annually cause large economic losses from mold growth. If an infector is present, pathogens may be air-borne in significant quantity. This is especially true for a hospital ward containing patients who are infected by readily cultivable and recognizable bacteria such as hemolytic streptococci.

Air-borne bacteria, unless they locate a fertile field in which to grow, settle finally, becoming a component of the dust. Here they remain viable for long periods of time. Housekeeping activities such as floor-sweeping, bed-making, and dressing can make them again air-borne upon the dust particles with which they are associated. Dust particles usually settle again rapidly, but before they have settled they may have found a host. The result may be a new infection.

The possibility of infection by air-borne organisms has been demonstrated by numerous animal experiments. Examples of these experiments have been the transmission of poliomyelitis to monkeys, distemper to ferrets and dogs, influenza to mice and ferrets, and tuberculosis to rabbits. In all cases the concentrations of air-borne bacteria were higher than normally found near human infectors.

Among humans, epidemics have occurred under conditions which are very suggestive that air-borne organisms were responsible. A hospital laboratory had an outbreak of Q fever

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caused by Rickettsia burneti. During the direct inoculation with viruses of measles and atypical pneumonia, cross-infections occurred among uninoculated individuals under conditions which indicated an air-borne route for the infection. Several secondary infections of smallpox occurred in an isolation hospital under conditions which seemed to compel the acceptance of air-borne transmission.

The high incidence of tuberculosis among attendants in tuberculosis institutions suggests that contact alone may not be the only means for transmission of the infection. The air route is also suspect. Infections have been contracted during operations in spite of the most careful aseptic technic. Detection of infecting organisms in the air of the operating room have suggested that infection may have originated by the air route.

What should be done about it? There appear to be two avenues of approach. One is the reduction of air-borne contaminants by suppression of dust, and dilution by ventilation. The other method is that of air disinfection.

Abolition of the broom and dry dust-cloths and substitution of the oily mop and moistened cloth can materially reduce the numbers of air-borne organisms. Dilution by ventilation is based upon recognition that out-of-door air is relatively free of microorganisms. The open window is a highly satisfactory method for rapid and adequate ventilation, but it is also one that, except during the warm days of summer, is highly objectionable to most persons. During the winter months the need for the conservation of heat makes it an impossible solution. Air samples taken in hospitals, schools, theaters, trains, and busses during the winter and examined bacteriologically have disclosed at some time all types of pathogens commonly found in the respiratory tract. It may be generally concluded that most enclosures are not adequately ventilated in winter. The introduction of air conditioning in buildings and the elimination or sealing of the windows increases the possibility of unsanitary air.

THE FIRST avenue of approach is helpful, but it does not reach the final goal—sanitary air. Therefore, some method of air disinfection appears to be necessary. The complete disinfection of all air is admittedly impossible. The open air is always safe, but the risk of air-borne infection becomes very great as humans crowd together. It does not appear possible at this time to provide air sanitation for all such conditions. However, there are, obviously, some localities where heavy bacterial concentrations are present and where air disinfection may be practical and warranted. Such localities are operating rooms, wards, contagious disease hospitals, pediatric departments, nurseries, barracks, and schools.

The problem of the mechanism for air disinfection has been studied extensively by the engineer and physicist working in cooperation with the bacteriologist. Chemical and physical means have been considered. Ultraviolet radiations generated by long-lived low current mercury discharge lamps have been found to be

Figure 1. Germicidal units in nursery of St. Luke's Hospital, New York City.

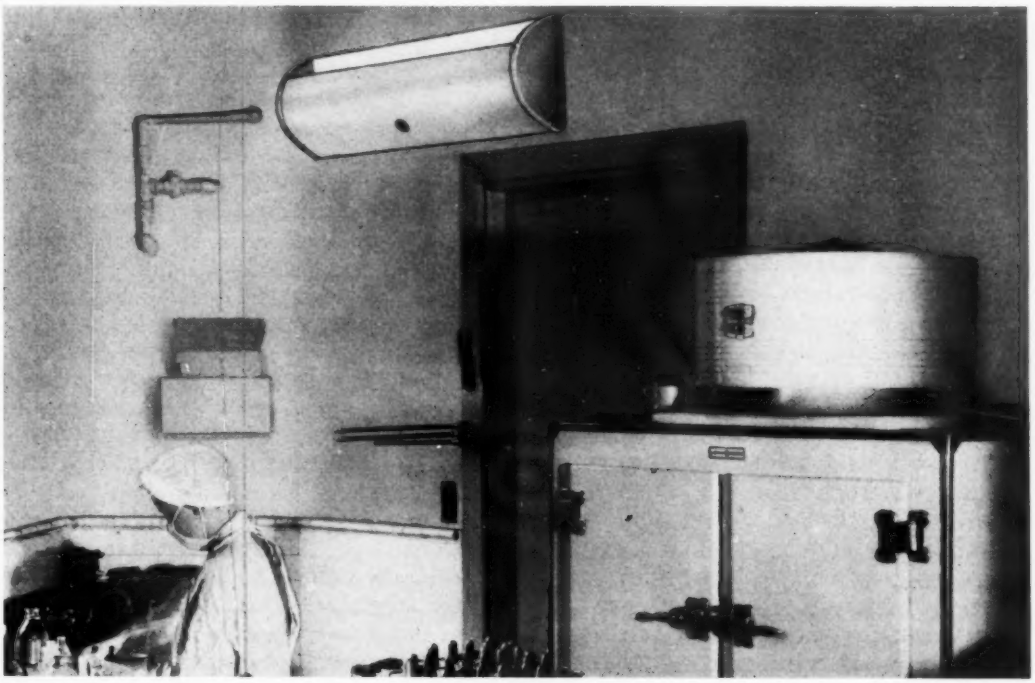

Figure 2. Germicidal units in formula room of St. Luke's Hospital, New York City.

very effective for killing air-borne bacteria. Many practical installations of ultraviolet air disinfection have been made. Some have been in operation for more than ten years.

When a pure water supply is being provided, the water does not have to be entirely sterile. In fact, water is usually considered safe for drinking purposes if not more than one B. coli is found per 10 cubic centimeters. Similarly, air disinfection does not require that sterile air be provided. The degree of sterility desired must be defined by the medical officer, the public health official, and the epidemiologist. At the present time it is generally considered adequate sanitary ventilation if each person receives 500 cubic feet of pure air per minute.

When ultraviolet air disinfection is employed, the degree of disinfection is considered to be such that each person receives the equivalent of 500 cubic feet of pure air per minute. This is attained when the ultraviolet radiation at wave length 2537 angstroms from the mercury lamp is one watt minute per 500 cubic feet of room capacity. Since over 90 per cent of the total ultraviolet generated by these low pressure mercury lamps is concentrated in wave length 2537 angstroms, the ultraviolet output of the lamp can serve as a guide for its effectiveness. This degree of equivalent ventilation may lower the bacterial content of the air to the same extent as one hundred or more complete pure air changes per hour.

Since these ultraviolet radiations produce biologic effects such as erythema and conjunctivitis, it is customary to restrict these radiations to the upper level of the room where the air can be maintained in a near-sterile condition. The bacterial concentration of the air in the lower, occupied portion of the room is kept low by being continually diluted with purified air from the upper strata. The rates of natural diffusion and recirculation of air within typical occupied rooms such as clinics, operating rooms, and wards have been measured and found to be sufficient to mix the air thoroughly 60 to 130 times per hour. In very closely confined spaces a fan may be desirable. The operating room is a special case, since ultraviolet rays must fall directly upon the patient. Surgeons and attendants must be protected by visor caps and clear-glass goggles. The usual face masks are worn.

THE FINAL criterion of the effectiveness of air disinfection must be the determination of a significant reduction in the incidence of disease in humans under controlled conditions. It is entirely logical that such determinations should be made in institutions where humans are under controlled conditions and continual surveillance of the medical staff. Children's institutions have proved excellent laboratories for the study of the efficacy of air disinfection in the prevention of cross-infections of all kinds, including the common cold.

A typical installation of ultraviolet air disinfection lamps is shown in the accompanying illustrations (see Figures 1 and 2), showing installations at St. Luke's Hospital, New York City. The nursery, infants' ward, and service rooms of this hospital are completely equipped. The service rooms have been included because there is considerable evidence that infections can occur as the result of food contamination by air-borne organisms.

Some children's institutions have been provided with ultraviolet air disinfection for ten years. They have experienced a marked decrease in respiratory infections and have had only very limited contagious disease outbreaks. Obviously, contagion by direct contact between ambulatory children at play cannot be controlled by air disinfection, so that some cross-infection did occur, but it was more limited in its scope. It is interesting to note that many of the adult attendants who do not live in the institutions and are therefore in sanitary air only during working hours claim to have fewer colds and sore throats since the lamps have been installed. Although their claims are not scientifically substantiated, the frequency with which they occur is indicative that they may have some basis in fact.

The infections that recurred with Staphylococcus aureus in clean thoracoplasty wounds

suggested to Deryl Hart in 1932 that an extensive survey of air-borne bacteria and aseptic procedures in the operating rooms of the Duke Hospital at Durham, N. C., should be made. As a result of this survey, it was concluded that a majority of the infections were resulting from contamination of sterile supplies and open wounds with pathogenic bacteria which were always floating in the air of the operating rooms in large numbers. The usual aseptic procedures and frequent ventilation of the air in the room by large quantities of pure out-of-doors air were not sufficient to accomplish a significant reduction in the air-borne bacteria. There always remained sufficient bacteria to cause an occasional infection. In addition, there were found peaks of air contamination associated with epidemics of respiratory diseases. The result of this survey was the first installation of ultraviolet lamps in an operating room for the control of air-borne bacteria. The results of the ultraviolet air disinfection were so successful that today a great majority of all hospital operating rooms in the United States are provided with air disinfection. It is considered an important adjuvant to other aseptic technics.

In their 1947 report the Committee for the Evaluation of Methods to Control Air-borne Infections of the American Public Health Association concluded that "available evidence strongly indicates that methods of air disinfection are useful adjuvants to aseptic technics in reduction or elimination of air-borne infection in operating rooms and in contagious disease and pediatric wards." Based upon this conclusion, and also upon some observations of its own, the Veterans Bureau is now proceeding to equip completely some of its tuberculosis hospitals with ultraviolet air disinfection. The goal is to prevent cross-infections not only of respiratory diseases but also of tuberculosis which animal experiments have demonstrated to be transmitted by the air route.

If a beginning for air disinfection is to be made outside the hospital sphere, the school would appear to be a logical place for it. There exist no physical nor engineering difficulties in providing ultraviolet air disinfection in schools; in fact, several schools have been so protected for over twelve years. These installations have been in the nature of experiments performed by epidemiologists who are mostly interested in the control of epidemic diseases, such as chickenpox and measles. They have given very little attention to the possible effectiveness of air disinfection on the incidence of colds and other nonspecific infections of the respiratory tract which cause so much discomfort, loss of efficiency, and absenteeism.

There is always present the question of effectiveness of partial protection since at this time it does not appear to be possible to provide complete air sanitation. Is there any practical advantage to spending the day in disinfected air if, during the morning and evening travel between home and business, an hour must be spent in the highly contaminated atmosphere of a crowded bus?

Many commercial organizations have been experimenting with ultraviolet air sanitation in the hope that it may decrease absenteeism resulting from frequent epidemics of colds and influenza. These experiments cannot be controlled as carefully as those performed in the hospital under the guidance of the medical staff and with the availability of case histories and expert technicians. However, by using time cards which the employees must clock when present and paying them only for the time clocked, an accurate record of absenteeism can be maintained. Obviously, such a record does not prove that the employee is home with a cold—he may have taken off a day to go hunting—but when considered over a period of years and compared to a similar period during which air disinfection is not employed, it may provide some indication whether partial protection has any merit.

It is too soon to judge the effectiveness of such a program, but some of the experiments have been in progress for enough years to indicate that partial air disinfection may have some benefits. For example, one Boston company claims that their absenteeism decreased from an av-

erage of 0.21 per cent for the four-year period 1939 through 1942 to 0.078 per cent for the four-year period 1943 to November 1947; during the latter years their complete establishment was fully protected by ultraviolet air sanitation. The employees who have been with the company during this entire period, 70 in all, believe that they have had only half as many colds since air disinfection has been employed.

The military services are interested in air disinfection in barracks. The Navy has had controlled experiments in progress since 1942, and has reported approximately 25 per cent reduction in the number of men reporting to sick call from barracks protected by ultraviolet air sanitation as compared to similar barracks which were not so protected. It was interesting to note that this reduction occurred in spite of complete intermingling of men from protected and unprotected barracks in mess halls, drill halls, and classrooms.

In addition to pathogens and viruses which affect man, the air may contain bacteria and mold spores which can cause large economic losses from food and product spoilage. Ultraviolet radiations can also kill these, though in the case of mold spores a much higher concentration of radiation is required than for bacteria alone. Refrigeration can reduce activities of these microorganisms, but does not always stop them entirely. The application of sanitary procedure, plus ultraviolet air disinfection in the handling and storage of food, is materially reducing food losses from spoilage.

The evidence to date indicates that air disinfection is being accepted as a component in sanitation. Its use in the hospital seems assured. The extent to which it is used elsewhere will depend upon its economic value, the convictions of the health officer, and public demand. The adoption of ultraviolet air disinfection is proceeding at a more rapid pace than did the establishment of pure drinking water and the pasteurization of milk.

ANESTHESIOLOGISTS HONOR JOHN S. LUNDY

DR. John S. Lundy, Rochester, Minnesota, has been awarded the Distinguished Service Award of the American Society of Anesthesiologists for his contribution to anesthesia in introducing an intravenous anesthetic, his comprehensive textbook, and the high caliber of his students. Dr. Lundy heads the department of anesthesia at the Mayo Clinic and associated hospitals and is professor of anesthesiology at the Mayo Foundation Graduate School of the University of Minnesota.

CORRECTION

In the December issue, the names of the co-authors of the Case Report on "Congestive Splenomegaly with Cytopenia," page 512, were inadvertently omitted. The co-authors are Leslie E. Bovik, M.D., and Eugene Brecher, M.D.

Postphlebitic Ulceration

JOHN E. SUMMERS*

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THE sequelae of phlegmasia alba dolens are manifested by the clinical entity known as the postphlebitic syndrome—edema, pigmentation, induration, and ulceration of the skin of the involved extremity. Bauer states that "more than nine tenths acquire indurative lesions and about four fifths leg ulcers."[4]

Postphlebitic ulceration of the leg should not be confused with simple varicose ulcer, arteriosclerotic ulcer, or ulceration associated with Buerger's disease. The presence of varicose veins plays a part in the production of the venous stasis and contributes to the formation of the postphlebitic syndrome but varicose veins may be absent.

From the existing evidence we may conclude the thrombus may completely occlude the of the leg, and, in the majority of cases, stops there. It may progress into the main venous channels of the leg, first unattached to the vein walls (the stage when embolism is possible), and cause very few, if any, clinical signs. Later, the thrombus may completely occlude the veins, causing venous obstruction, arterial spasm, and reduced lymph flow, and giving the clinical picture of phlegmasia alba dolens.

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PROPHYLACTIC MEASURES AGAINST MILK LEG

The postphlebitic syndrome is best treated by preventing phlegmasia alba dolens. This means, for the most part, early ambulation and leg exercises after obstetrical delivery and operative procedures. Measures to prevent venous stasis in the legs have been emphasized by Ochsner,[22, 23] who recommends that compression bandages be applied to the extremities of patients over 40 years of age who are confined to bed.

After phlegmasia alba dolens has developed, the resolution of the process is greatly assisted by release of the vasospasm as advocated by Ochsner and DeBakey[24] and deTakats.[8] The use of the anticoagulants, heparin and dicoumarol, are reported to give good results and are very widely used in the treatment of thrombosis.[3, 12, 17, 21, 28] Whereas Ochsner states: "By the prompt induction of vasodilatation, the symptoms and signs in phlegmasia alba dolens are quickly alleviated and the postphlebitic sequelae are eliminated."[22] Bauer writes: "There seems to be every probability that

JOHN E. SUMMERS

heparin treated patients will, as a rule, escape those troublesome after effects which, according to our experience, regularly appear in conservatively treated thrombosis patients and consist in permanent swelling of the leg and, later on, brown induration and ulcers."[4]

TREATMENT OF POSTPHLEBITIC ULCERATION

The treatment of postphlebitic ulceration is more complicated than that of simple varicose ulcer in that in the former the valves of the deep and communicating veins have been damaged and rendered incompetent by the thrombotic process. During the attack of phlegmasia alba dolens the superficial veins (the saphenous systems) dilate and their valves become incompetent, so that in the later stages the valves of the deep, communicating, and superficial veins are all incompetent, and the venous circulation of the extremity, in the standing position, is compromised.

Excision of the varicose veins and the ulcerated area—Homans[16, 17] stated "that veins of the lower leg be fully dissected and, as far as possible, the perforating veins found and tied on the deep fascia. This may mean dissecting in densely scarred infected tissue. It will usually mean the excision of ulcers down to sound tissues even if the dissection exposes bone, muscle, or tendon sheath. Such dissections require the greatest gentleness and patience." Usually an immediate skin graft is applied to the defect. In addition to the above, excision of the deep fascia under the ulcer may be advised, so that new lymph vessels can grow in from the tissues beneath, working on the premise that lymphatic obstruction is the main cause of phlegmasia alba dolens.

For extensive and multiple ulcers of many years' duration with much swelling, Trout[30] removes the affected area, a long strip of the deep fascia in the thigh and the leg, widely excises the ulcers, and skin grafts the defect; he also removes all varicose veins and their incompetent communications. Good results were reported in 26 of 27 cases so treated.

Owens[26] also recommends excision of chronic postphlebitic ulcerations. The operative procedure consists of complete excision of all scar surrounding the ulcer, with a wide lateral margin, and complete extirpation of all scar forming the floor of the ulcer, including the deep fascia. Complete extirpation of all scar requires dissection which is sufficiently radical to expose underlying muscles and tendons.

The procedure described above not only fulfills all the requirements for obliterating varicose veins to relieve venous stagnation and for re-establishing lymphatic communications between the superficial and the deep systems in overcoming lymph stasis, but also affords a vascular supply that springs from the tissues beneath the deep fascia to send capillaries upward which will be adequate to support skin grafts for the repair of the defect produced. The patient is put to bed with continuous hot wet hypertonic saline dressings; the leg is kept

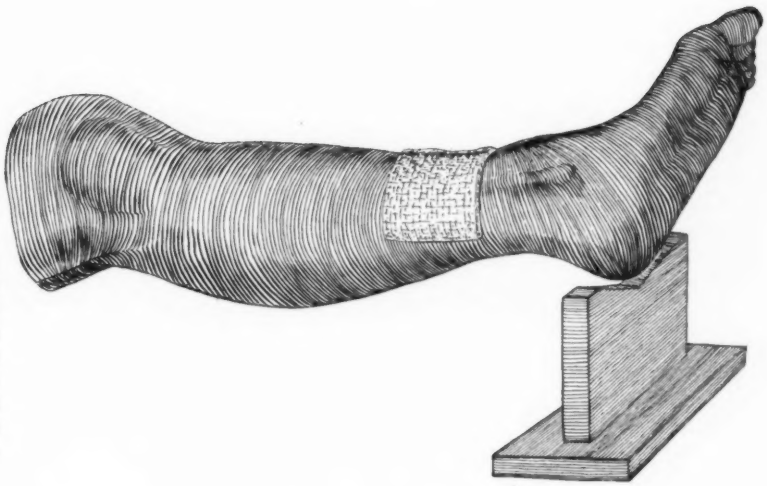

Figure 1. Technic of application of Unna's paste boot. With the patient supine, the heel of the affected leg is supported on a stand. The extremity is cleansed and a simple dressing (vaseline gauze) is placed over the ulcer. The boot is best applied after a period of elevation of the lower extremity so that swelling will be at a minimum.

under a heat tent for two weeks and then skin grafted. Following skin grafting, the leg is kept elevated for another two weeks and the patient is gradually made ambulatory. Pressure dressings are worn for nine months. The procedure requires from six to eight weeks of hospitalization.

Heller in 1943[14] preferred to excise the entire indurated area and skin graft the defect.

Thorough excision of the entire area, down to the fascia, which need not be excised, is recommended by deTakats.[8] The defect is then immediately covered with a split-thickness skin graft, which is secured in place both by the help of sutures and by plasma-thrombin glue, which nourishes the graft and helps its early vascularization. In 1945 deTakats wrote: "Of twenty-three split-thickness grafts which had a primary 85 per cent to 100 per cent take and which were firmly healed on discharge, six broke down again at the end of one year, in spite of adequate elastic support. Small perforating veins develop and thrombose under the graft, and over them the skin breaks."[10]

Padgett and Gaskins in 1945[25] reported 45 cases of chronic ulceration or skin defect in the lower leg which were treated by raising flaps of whole skin from the calf of the opposite leg and sewing them to the previously properly prepared defect; an immediate skin graft taken with the Padgett dermatome was applied to the donor area. Proper application of the cast holding the legs together determined the end result of treatment.

Excision of the varicose veins and all communicating veins—Veins may be dissected out through a long incision extending from the knee to the ankle on the medial side of the leg.

LINTON's plan of operation* is as follows: The patient with postphlebitic ulceration is put to bed and the ulceration is epithelized by conservative methods, using a Thiersch skin graft if necessary. After the ulcer has healed and the patient has been ambulatory with elastic bandages for several weeks, a high saphenous ligation is done whether or not the great saphenous vein is varicosed. The deep femoral vein distal to its profunda branch is also interrupted. The patient is then discharged and sent home; he wears elastic bandages for about six weeks, at the end of which time he

*Described in a personal communication dated November 8, 1945, from Robert R. Linton, M.D., 1101 Beacon St., Brookline, Mass.

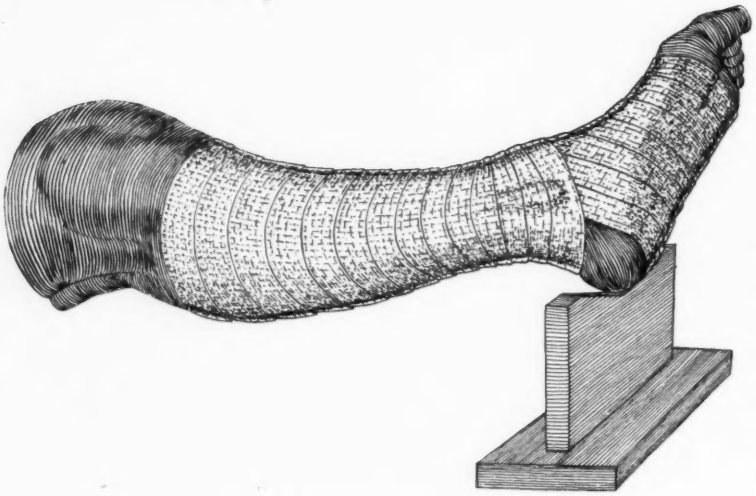

Figure 2. Using a 2-inch white gauze roller bandage, the foot, ankle and leg, to the knee, are snugly and neatly bandaged. The bandage must start at the metatarso-phalangeal joints and be snugly applied around the ankles, otherwise swelling will occur at the unbandaged areas.

returns for the removal of the communicating veins of the leg. The saphenous vein in the leg and its communicating branches are excised through a long, straight skin incision on the medial side of the leg, extending from the knee to the ankle. A plaster shell is applied and the patient is put to bed for about two weeks. He is gradually made ambulatory and must wear compression bandages for an indefinite time to control the postoperative edema.

Removal of varicose veins and ligation of the femoral vein—Twenty-one cases of chronic deep thrombophlebitis were reported treated by removal of the superficial varicosities and ligation of the femoral vein. As superficial varicosities developed following the ligation, they were excised or ligated. In 1945 Buxton and Coller[5] made a supplementary report in which they infer that relief of the edema has not followed and that the ulcers that healed would have healed anyway due to the good care that the patient received.

Sympathectomy—In cases of large ulcers with much induration, wide, deep excision of the affected tissue and skin grafting should be carried out. If such patients have demonstrable vasospasm, this procedure may be combined very profitably with sympathetic denervation. Adams[1] states that a lumbar sympathectomy is used for persistent ulcers on moist, sweating, fungus-infected legs and for multiple, punched-out, circular ulcers on brawny, cyanotic legs, secondary to deep, obliterative thrombophlebitis. Smithy[29] reported three cases of chronic ulceration of the leg treated by lumbar sympathectomy, two of which healed, but the third case required wide, deep excision of the involved tissues and skin grafting.

Compression bandages, with special reference to Unna's paste boot—It has long been recognized that the use of adequate compression dressings will, in the majority of cases, allow this type of ulcer to heal. Although putting the patient to bed and keeping the leg elevated also permits healing since the venous stasis is thereby overcome, the use of Unna's paste boot allows the patient to continue work.

To make 3½ pounds of Unna's paste: glycerin, 712 cc.; gelatin, 312 gm.; zinc oxide, 125 gm.; water, 950 cc.

The gelatin is melted in the heated water (over a water bath), and the glycerin and zinc oxide are added while stirring the mixture. The paste jells on cooling and is reliquefied by heating over a water bath just before it is to be applied.

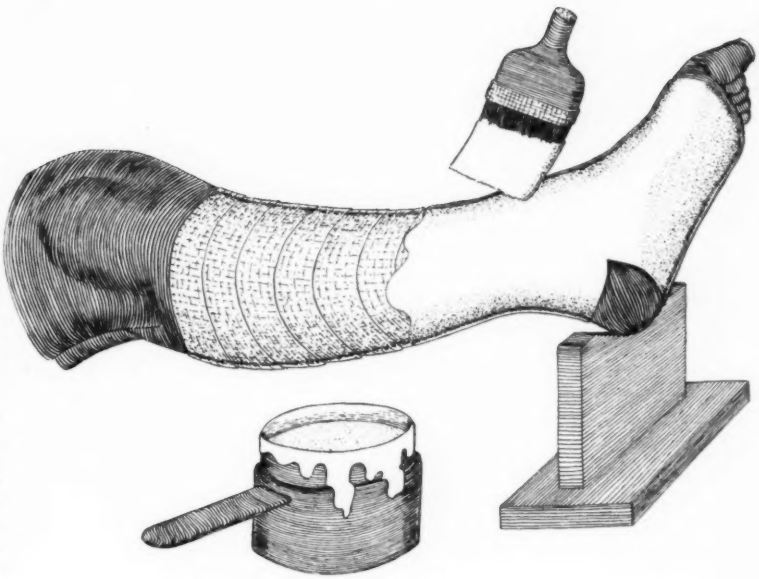

Figure 3. The Unna paste, having been melted over a water bath, is now applied while warm. After the first layer of bandage has been covered with the paste, the second layer of bandage is applied. On top of this the second coat of Unna's paste is brushed and a third and fourth layer of 2-inch gauze bandage is wrapped on. As the final layer, a 2-inch paper-crepe bandage may be applied for cosmetic reasons and a few strips of ½-inch adhesive tape wound obliquely over the paper to hold it in place.

THE application of the bandage is very simple. If one keeps in mind that the purpose of the bandage is to form a pliable but inelastic, constant pressure to the entire lower extremity, the application will be successful. The most common errors are applying the bandage too loosely and not including enough of the foot and ankle in the bandage.

1. With the patient in a supine position the heel of the affected extremity is placed at rest in the padded notch of a wooden support. A pad of some type may be placed under the thigh so that the leg will be elevated in a restful position.

2. The extremity is cleaned and any kind of bland dressing such as vaseline gauze is placed over the ulcer.

3. Beginning at the toes, care being taken to include both malleoli, a two-inch gauze bandage is neatly applied to the lower extremity to the knee.

4. A coat of Unna's paste (warm) is applied with a brush to the bandage.

5. A second layer of gauze is applied to the extremity.

6. A second coat of Unna's paste is applied.

7. A third and fourth layer of gauze are then applied.

8. The final coat is a layer of crepe-paper bandage to prevent the paste from oozing through and soiling the stocking.

9. A few strips of half-inch adhesive tape are wound around the leg to hold the paper bandage in place.

10. The boot is removed every week or so and a new one applied until the ulcer has healed.

OUTLINE OF TREATMENT FOR POSTPHLEBITIC ULCERATION

1. The ulcer is healed by repeated applications of Unna's paste boots, the patient being ambulatory and working as usual.

2. The patency of the deep veins is tested by having the patient wear a tight elastic bandage (elastoplast) for one week.

3. Thorough removal of the superficial

varicose veins by a careful high saphenous resection, stripping the great saphenous vein in the thigh and as far down as possible in the leg, and excision of all incompetent communicating veins in the leg. One should never inject a sclerosing chemical into the veins of a patient who has had a previous phlebitis, as even the injection of a small amount frequently causes a severe exacerbation of the phlebitis.

4. Reapplication of Unna's paste boots if ulceration recurs.

5. Encourage the patient to wear an elastic stocking for the rest of her life.

6. Rehabilitation of the patient so that she will not be standing on the extremity continuously for long periods of time.

SUMMARY

Phlegmasia alba dolens which permanently damages the veins of the lower extremities may be prevented by encouraging leg exercises and early ambulation after operations and post partum. Active treatment of the acute phlegmasia alba dolens by early ambulation, paravertebral sympathetic nerve block, or the use of anticoagulants, heparin and dicoumarol, may prevent or minimize the onset of the postphlebitic syndrome. Postphlebitic ulcerations are best treated by the use of Unna's paste boot, removal of superficial varicose veins and all incompetent communicating veins, rehabilitation of the patient to obviate the standing position, and having the patient wear elastic, compression stockings for the rest of her life.

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Diagnosis and Treatment of "Sarcoptes Scabiei" Infestations

EUGENE A. HAND*

SAGINAW AND BAY CITY, MICHIGAN

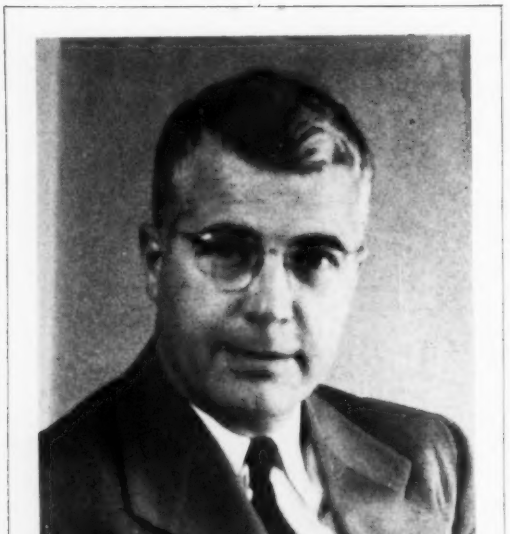
Scabietic infestations increased in both the northern and southern states during and after the Civil War, and then became uncommon until just after the War of 1898. Because of this war and also because of the mass immigrations from Europe around 1900, this disease increased in Canada and the United States. There was also an increase during and after World War I.

There was considerable apprehension that the demobilization of our world-traveled veterans after World War II would result in an increase in those tropical and contagious diseases that had heretofore been rare in this country. Fortunately this was not true for malaria, yellow fever, cholera, filariasis, and intestinal parasites. However, as has usually been the case following wars, revolutions, mass immigrations, and social upheavals, there was a rise in venereal disease, fungus infections, and scabies.

Scabies is more common in the colder months, reaching a peak in March and April. The normal decrease in scabies expected in the summer of 1946 did not occur, however, because of the demobilization of many infested army and navy personnel pouring fresh scabies into the civilian population. The summer of 1947 saw the normal decrease, but the disease was again on the increase in the fall of 1947.

The author's interest in the condition was sharpened while he was a United States Navy liaison officer with the Australian Army in Perth, Western Australia, during World War II. The unfortunate use by the Australians of bichromate as a dye for their khaki uniforms and blankets led to many cases of khaki or chrome dermatitis. During the early stages of this condition the presence of general pruritus which is aggravated at night, as in the case of scabies, made the differential diagnosis difficult. This was important because the treatment of these conditions is diametrically opposite. The complications of dermatitis, pyoderma, and eczematization often chronic in type, seen from treatment of scabies with sulfur and other scabieticides, were even more common and distressing when used by error on the skin irritated by the bichromates. It was imperative to discover an easy method of finding the acarus scabiei organism in order to make a definite diagnosis, thereby avoiding this error.

Bonomo, of Leghorn, Italy, in 1687 described the finding of the Sarcoptes scabiei var. hominis



EUGENE A. HAND

after teasing the female adult out of a scabietic lesion on the point of a needle or pin. This has been the classic method for demonstrating the scabies insect and is so described in most textbooks on dermatology. This method which is difficult, time-consuming, and impractical has been likened to the difficulty of finding the pot of gold at the end of the rainbow.

The accidental discovery of the adult female acarus in potassium hydroxide direct examination while searching for fungus in skin scrapings, led to the routine search for scabies organisms by this method in all cases of suspected scabies. This was most helpful when sulfur had to be used because of a shortage of benzyl benzoate. For a few fleeting moments it was believed that an original method for demonstrating the acarus had been found but the remembrance of the excellent photomicrographs exhibited at the 1941 Academy of Dermatology and Syphilology soon dispelled this illusion.

Friedman in 1942 noted that the acarus could easily be demonstrated by the scrape and smear method, and also that the diagnosis could be made by finding acarus eggs filled with embryo or empty, skeletal parts of the acarus, the larvae, and the scybala.

TECHNIC OF THE SLICE, SCRAPE, AND SMEAR METHOD

This is a simple method and is easily learned. It is important to make a careful search over the affected parts to pick out lesions most likely to give a positive diagnosis. Here experience is a great aid. Ordinary rules of cleanliness and asepsis should be observed. For lesions on the webs of the fingers, the fingers, and the wrists, a sterile sharp razor blade is used to shave off a very thin slice of the vesicle, pustule, or burrow. For lesions on the abdomen, genitalia, buttocks, and other parts less easily reached, scraping of the lesion with the razor or a sterile Bard-Parker knife is best. The slice or scrapings are then transferred to a glass slide, covered with a cover slip and dissolved in 10 to 20 per cent sodium or potassium hydroxide. The slide is then examined under low power, using high power when needed. The thrill of finding the scabietic elements, making a definite diagnosis, and the value of this diagnosis, prior to treatment, is well worth the trouble necessary to master this technic.

Photomicrographs showing the adult female, the hexapod larvae, filled and empty eggs, scybala, and skeletal parts of the Sarcoptes in the accompanying figures will be of great help to the reader and user of this method.

CLINICAL DIAGNOSIS OF SARCOPTES SCABIEI INFESTATIONS

As with all disease, a high index of suspicion is most important in the recognition of scabies. The reader is referred to the classic descriptions of scabies in modern textbooks on dermatology. Only a few important facts will be mentioned in this article. It is most impor-

Figure 1. Ventral view female adult acarus.

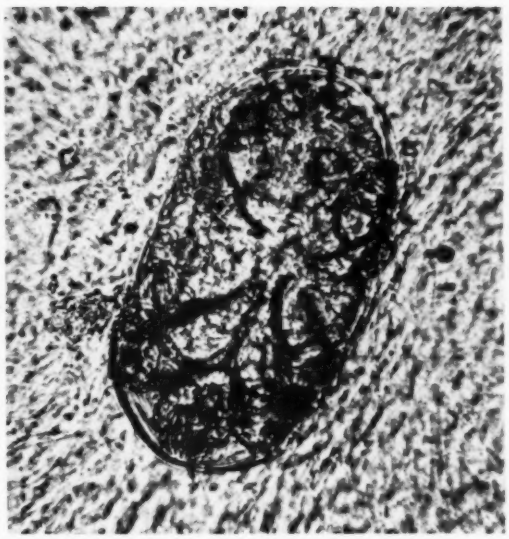


Figure 2. Acarus egg with embryo. (High power.)

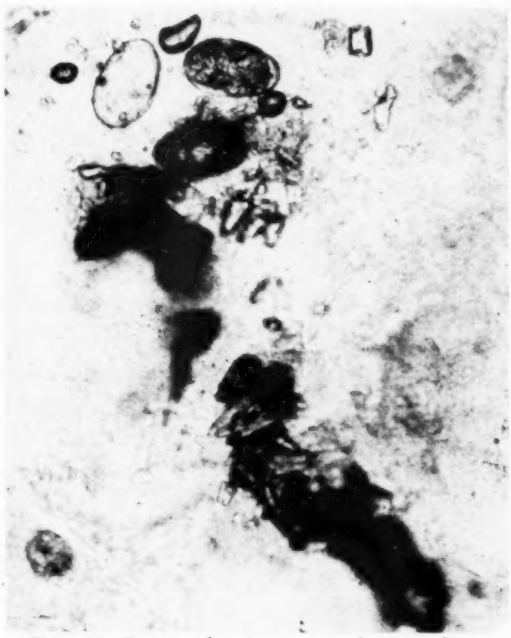


Figure 3. Burrow showing eggs and acarus feces or scybala.

Figure 4. High power of adult female acarus showing egg in oviduct.

tant to ask about and examine, if possible, other members of the family and other contacts in suspected cases. The classic symptoms of an itch that is worse at night are not always present. This is particularly so in early cases, atypical cases, and cases that have been treated.

IN CHILDREN, especially babies, the scalp and face are at times involved; this is almost never true in older persons. In babies and children the sexes are about equally affected, but in adults, men, for some unknown reason, are affected three times as often as women.

It is important to examine the male genitals, since the presence of an erythematous papule or burrow on the shaft of the penis or the scrotum is almost pathognomonic. Examination of the genitalia of the sex partner of a woman suspected of scabies often will clinch the diagnosis.

Scabies should be suspected in all cases of furunculosis, as this condition often masks the underlying scabies. This is also true of ecthyma, pyoderma, and impetigo in children.

The following areas should always be examined: the webs of the fingers, the anterior wrist, the inner and posterior elbows, the anterior axillary folds, the nipples and breasts in women, the navel and abdomen, the shaft and glans penis in the circumcised, the penis shaft to the external rim of the foreskin in the uncircumcised, the scrotum, the buttocks, the knees, ankles, and toes.

Although scabies is commoner in the poor and unclean, it is found in all classes and in all periods of life. In most cases it is spread by contact with infested individuals. Although scabies may be contacted by handling towels, toilet articles, and other articles handled or worn by a scabietic, this is probably rare. It is usually necessary to have intimate family contact such as sleeping or cohabitating with an infested individual. It probably can be picked up from toilet seats, but again this is doubtful. Dancing and petting are common methods of spread. This is a disease of lodginghouses, ships, barracks, and the like. It is common in prostitutes and many men are infested from this source.

TREATMENT OF SCABIES

Prophylaxis—Next to avoidance of infested persons, frequent bathing is the best prophylaxis. One should avoid using an infested individual's clothing, towels, bedclothes, or sports equipment. The prophylactic treatment of those exposed to scabietics will prevent many new cases.

Treatment of contacts—It is of primary importance in treating this disease to remember that scabies is a family and community disease. If this is not remembered, scabietics even though cured, will be reinfected from some other contact, and the treatment will be a failure. This has aptly been described as "ping-pong" scabies.

It is important to treat all infected contacts and to provide prophylactic treatment to others who have had intimate contact with the case. Those with definite or indefinite symptoms and signs usually will take the treatment avidly. Those without any sign are difficult to convince of the need of treatment; it is most important to discuss the problem with them. They should be told that there is an incubation period between infestation and development of symptoms. Mellenby has shown that after infestation a month or longer may elapse before the daughters of the original and invading mites begin to lay their eggs. Thus six or more weeks may pass from exposure to general scabietic disease.

Treatment of clothing, bedding, towels, etc., of the infested—Even slight personal contact serves to spread scabies. Whether scabies can be transmitted through clothing, blankets, and other indirect contacts is still questionable. Mellenby in 63 trials with all conditions as favorable as possible was able to transmit the disease in only two cases through infested underclothing and blankets. Mellenby found that the organism was killed in almost every case within 5 minutes at 120°F. The humidity had little effect on the thermal death point.

Figure 5. Acarus burrow with adult female acarus and acarus eggs.

Figure 6. High power of acarus eggs.

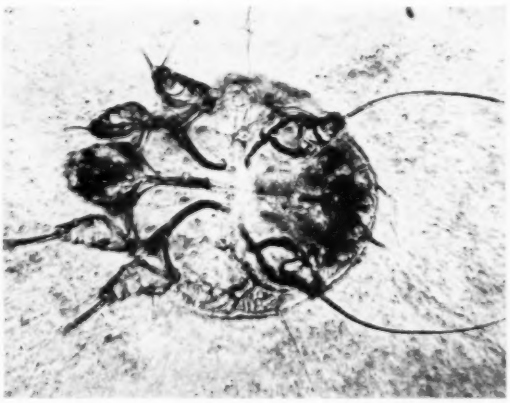


Figure 7. Hexapod acarus larvae.

Figure 8. Skeletal parts of the acarus. (All that is sometimes found in searching for the acarus by this method.)

Figure 9. Empty acarus eggs. (High power.)

Official U. S. Navy photos—reproduced, courtesy of U. S. Naval Medical Bulletin.

The mite survived away from the host a maximum period of fourteen days at 55°F. and 90° relative humidity. The organisms and eggs are believed destroyed in a house in one week-end by keeping temperatures at 85° to 90°F.

Washing garments except woolens with soap and water is effective to destroy the mite. As the mite is easily killed by high temperature, use of a hot iron on woolen trousers, skirts, etc., will suffice.

Treatment of the individual—Space will not permit any more than a mention of the scabieticide specifics such as balsam of Peru, rotenone, betanapthol, styrax, xylene, pyrethrum, gasoline, synthetic sulfur compounds, D.D.T., etc. This paper will be limited to the use of sulfur and benzyl benzoate. The other compounds mentioned are at times very helpful in stubborn and atypical cases, but most physicians, unless especially interested in skin disease, do not need to use them, since benzyl benzoate and sulfur usually will suffice.

The main problem in treating scabies is to kill all the adult acarus organisms, the larvae, and the embryo in the eggs without disabling, injuring, or killing the host. In judging the efficacy of any scabieticide one has to determine only two things: (1) Is the preparation effective in killing the acarus elements? (2) Is the preparation, under the conditions necessary for the material to kill the acarus, apt to cause dermatitis and eczematization with accompanying furuncles, pyodermas, and ecthyma?

All preparations that fail to kill the acarus elements readily, and those that only cure in strengths which cause untoward skin reactions are worthless. Preparations that kill the acarus quickly and effectively without producing untoward reactions except in rare instances are ideal. Between these extremes are all variations.

Blondes and children, particularly babies, are more prone to develop dermatitis. Itching after treatment of scabies may indicate failure in cure, but this is more likely to be due to certain allergic manifestations from the dead acarus which are as yet not well understood. The itching may well be the result of the treatment. Do not re-treat at once, but use ordinary soothing dermatologic treatments. This is of prime importance. Experience here is vital in handling scabietics. Expect and diagnose dermatitis from treatment, early. Discontinue or change the treatment at once. More chronic skin disease in later life can be traced to injudicious treatment or overtreatment of scabies in babyhood and childhood, than to any other cause.

Sulfur has been known since ancient times, being mentioned in Homer and the Bible. It was used by the Greeks and Romans as a fumigant. It has been used as a scabieticide since at least the Middle Ages and was the best treatment until the advent of the newer scabieticides such as benzyl benzoate.

Sulfur has been used internally for scabies, but is worthless when taken in this way. Sulfur in the form of sulfur foam applications and sulfur soap has had an unfortunately large following. Cure with this method is rare, and untoward reactions are common.

Sulfur vapor, a revival of an ancient method, was used in World War I. The soldiers wore gas masks during the treatment. The percentage of cure was low in comparison to modern methods.

The English and Germans introduced a number of synthetic sulfur compounds. Tetraethylthiuranmonosulfide and also mitigal (dimethyldiphenylenedisulfide) are two of these which are supposed to be most effective. The chief drawback in the use of mitigal has been the expense. These compounds have not been tried to any great extent in this country.

Sulfur in ointment form, especially when incorporated in the newer vanishing cream bases, is cheap, easily obtained, and highly effective. The drawbacks are that it is messy and prone to produce dermatitis and pyoderma in too many cases.

In selected cases sulfur still is a good form of treatment. A 3 per cent sulfur ointment for babies, a 3 to 8 per cent ointment for children

and the fair-skinned, and a 5 to 15 per cent ointment for the dark-skinned is suggested. Usually this should be applied all over, from the neck down, twice daily for three to five days without bathing. Expect, look for, recognize, and treat dermatitis early.

Benzyl benzoate is rightfully the treatment of choice for scabies. This is not a new form of treatment, as this drug is the active substance in the old scabieticide, balsam of Peru. As pernol it was brought out by Sachs and Juliusberg in 1900. Kissmeyer popularized it in 1937. The great English authority on scabies, Mellenby, strongly advocated its use during the great scabies epidemic in England in World War II.

The choice of a vehicle for this drug is most important since most cases of dermatitis from its use are due to the vehicle. Spirits, soft soap, lanette wax, various emulsion bases, calamine lotion, and calamine liniment have been used. Spirits and soft soap were particularly prone to cause reactions on the skin.

When treatment lasts one day or more, dermatitis and eczematization occasionally occur and should be recognized early and treated. Remember, as with sulfur and other methods, that postscabietic pruritus is more likely a result of sensitization factors from the dead acarus or from the treatment, and less likely a result of failure to cure. Avoid re-treatment and overtreatment.

A schedule of treatment that I have found very effective in both military and civilian practice has been the use of 20 per cent benzyl benzoate in calamine lotion or preferably liniment over the body from the neck down, twice daily for three to five days. In babies and fair-skinned persons 5 to 10 per cent benzyl benzoate is advocated in place of the stronger preparation. It is important to follow the case up so that overtreatment will be avoided. Usually after this course the patients are instructed to avoid soap, to take daily colloidal baths, and to use nonirritating topical applications for several weeks. The use of nonirritating soap substitutes, such as dermolate soap, for bathing for several weeks has given very gratifying results, especially in those cases that developed a mild reaction.

A short two-day course with this preparation as a prophylactic treatment for those who might be in the incubation period after exposure to scabies has been most helpful.

SCABIES AND DDT

Goldberg reports the successful treatment of scabies with a 7 per cent solution of DDT in equal parts of xylol, ether, and liquid petrolatum. The lotion was applied once a day for three days; the average patient used 240 to 300 cc. of the fluid. Of 307 patients so treated, 95 per cent did not experience pruritus after the first treatment. The author states that no untoward side effects of treatment were observed. Some months ago Carpenter and his associates reported similar success in the use of a mixture of benzyl benzoate, DDT, and ethylaminobenzoate in an emulsion of "Tween 80" and water. These workers sprayed the emulsion on the patient.

While these results are impressive, attention should be called to the numerous reports of the toxicity of DDT or its solvents. Although this valuable insecticide is not toxic in its powdered form, when it is dissolved in oil it is readily absorbed through the skin and either it or its solvent is capable of producing severe local and generalized reactions. Furthermore, the patient suffering from this type of poisoning may be incapacitated for many weeks, and might not recover entirely in less than a year.

SCIENTIFIC EXHIBIT

Should Your Patient's Gallbladder Be Removed?

J. RUSSELL TWISS, M.D., AND R. FRANKLIN CARTER, M.D.

NEW YORK POSTGRADUATE HOSPITAL, NEW YORK CITY

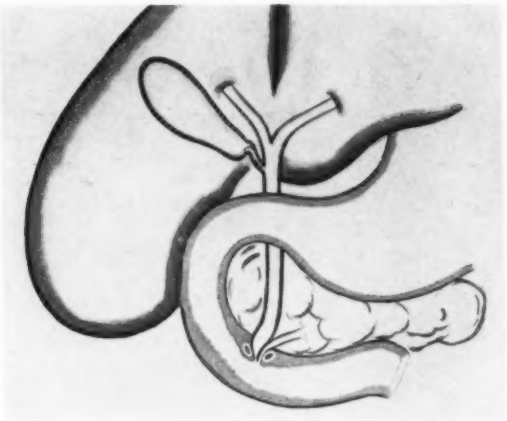
Comparative Statistical Chart of Pre-operative and Operative Findings in 253 Patients

	Pre-stone	*Functioning Gallbladder with Stone*	*Nonfunctioning Gallbladder with Stone*	*Common Duct Stone*
	Per Cent	*Per Cent*	*Per Cent*	*Per Cent*
History				
Colic	35	62	64	52
Jaundice	10	14	21	65
Physical				
Tenderness	74	49	52	61
Palpable gallbladder	3	0	6.9	6
Enlarged liver	10	1.5	5	21
Jaundice	3	1.4	4	62
Roentgen-ray				
Visualization	97	83	21	22
Non-visualization	3	17	79	78
Stones	0	94	58	
Duodenal drainage				
Dark bile	93	73	37	47
Crystals	51	74	55	46
Positive culture	26	20	26	70
Blood analysis				
Liver damage	0	2.5	1.5	20
Operative findings				
Gallbladder bile				
Concentrated	100	100	3	0
Non-concentrated	0	0	57	0
No bile	0	0	40	0
Crystals	35	87	96	83
Pancreatic ferments	59	74	63	44
Positive culture	10	13	25	80
Pancreatic involvement	3	1.7	1	14

NORMAL GALLBLADDER

Symptoms

Suggestive of gallbladder disease were:
R. U. Q. pain
Belching
Distention
Nausea—vomiting
Fat intolerance



Signs

Physical examination negative

Duodenal Drainage

Free HCl gastric	Fasting $<20^0$ — Ewald $<40^0$		
Bile	Duodenal	Mag. Sulph.	Olive Oil
Concentration	+	+++	++++
Crystals Cholesterol CA-bilirubinate	0-$\pm$	0-$\pm$	0-$\pm$
Cultures	Sterile		

Blood Chemistry

Icterus index—4-8 units
Serum bilirubin—<1 mgm. per cent
Alkaline phosphatase—3-5 (Bodansky) units
Total cholesterol—150-230 mgm. per cent
Cholesterol esters—40-60 per cent of total
Cephalin flocculation—negative
Thymol turbidity—<4 units

X-ray

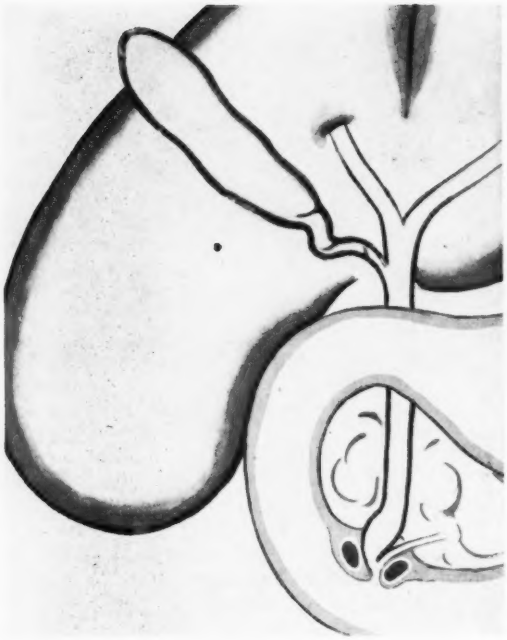
Normal visualization

Normal emptying

With the Above Findings, Surgery Is Never Indicated

HYPERTONIC DYSKINESIA

Surgery Not Indicated



Symptoms result from overdistention secondary to common duct sphincter spasm. Stimulation sources may be:

(1) Reflex—C.N.S. or focal

(2) Hyperacidity (duodenitis, papillitis)

Symptoms

Pain—dull or colicky in epigastrium or R. U. Q.
Belching
Fat intolerance
Constipation

Signs

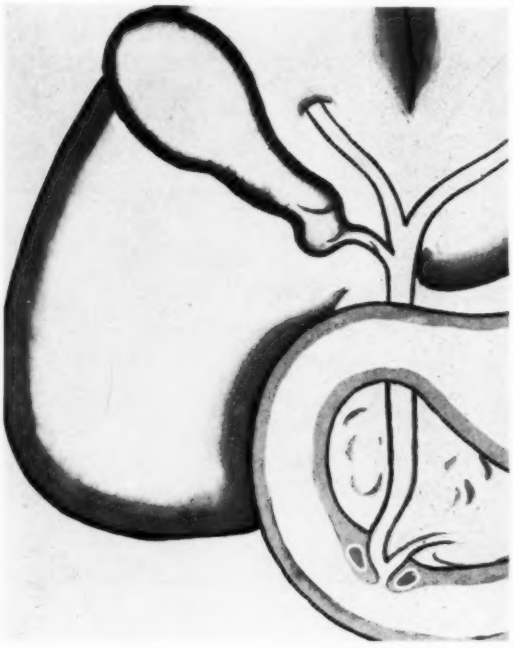
Tenderness in epigastrium or R. U. Q.

Blood Chemistry

Normal

Duodenal Drainage

Free HCl gastric	Under 20° in reflex type Over 20° in hyperacidity type		
Bile	Duodenal	Mag. Sulph.	Olive Oil
Concentration	+	+++	++++
Crystals	May be present		
Cultures	Sterile		



X-ray

Normal visualization

Delayed emptying

Enlarged tubular gallbladder

Treatment

Reflex Type
- Medical—For autonomic imbalance, nervous tension, menopause
- Surgical—Remove focus of reflex irritation (appendix, renal calculus, etc.)

Hyperacidity Type
- Medical—Bland diet, antacids, antispasmodics, sedatives

HYPOTONIC DYSKINESIA—METABOLIC DISORDERS COMMON

Surgery Not Indicated

Symptoms

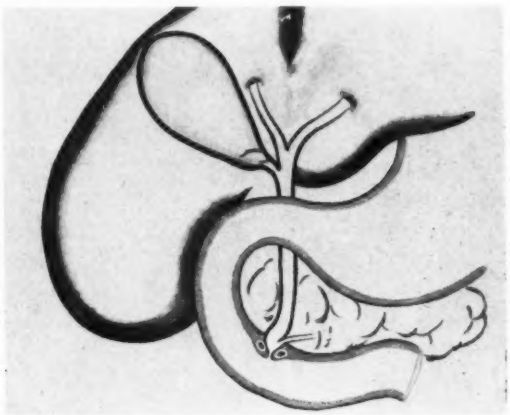
Vague R. U. Q. discomfort
Pain is unusual
Belching—Distention
Constipation (atonic)

Signs

Obesity usual
Physical examination is otherwise negative

Blood Chemistry

Blood cholesterol usually elevated
All other findings normal



The atonic gallbladder usually occurs in persons over 40, sometimes with hypothyroidism

X-ray

Fair visualization Enlarged globular gallbladder *Slow emptying*

Duodenal Drainage

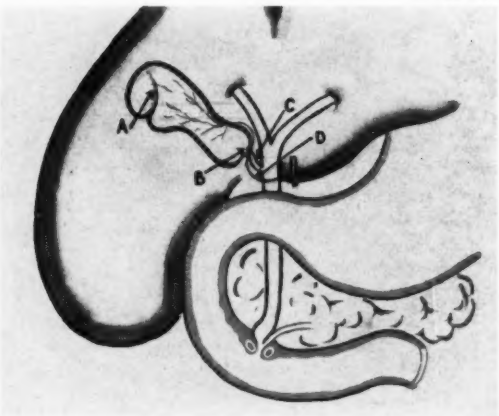
Free HCl gastric	Absent or low		
Bile	Duodenal	Mag. Sulph.	Olive Oil
Concentration	++	++	++++
Crystals	May be present		
Cultures	Sterile		

Treatment

1. Treat associated conditions.
2. Diet as indicated. Low cholesterol for hypercholesteremia. Intermediate feedings with foods stimulating gallbladder evacuation.
3. Olive oil between meals.
4. Dilute HCl.

OBSTRUCTION (ANATOMIC) OF GALLBLADDER

Surgery Indicated



A. Phrygian cap
B. Valves of heister
C. Convoluted cystic duct
D. Aberrant cystic artery

Symptoms

R. U. Q. colicky pain
Attacks—intermittent

Signs

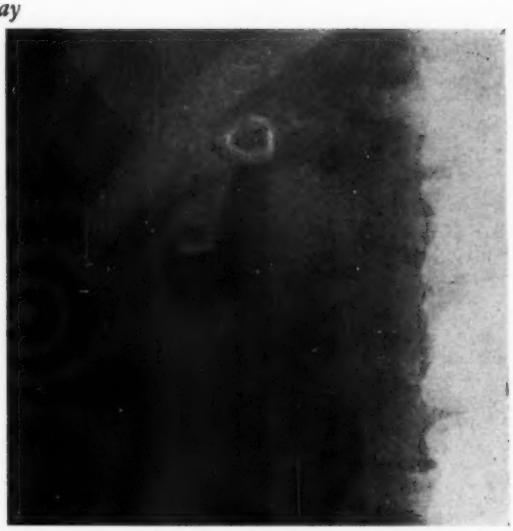
Tenderness in R. U. Q.
Pain may be relieved by change in posture or enema

Blood Chemistry

Icterus index—4-8 units
Serum bilirubin—<1 mgm. per cent
Alkaline phosphatase—3-5 (Bodansky) units
Total cholesterol—150-230 mgm. per cent
Cholesterol esters—40-60 per cent of total
Cephalin flocculation—negative
Thymol turbidity—<4 units

X-ray

Cystic duct obstruction



Phrygian cap with stones

Duodenal Drainage

Free HCl gastric	Normal		
Bile	Duodenal	Mag. Sulph.	Olive Oil
Concentration	++	++	+++
Crystals	May be present		
Cultures	Sterile		

Treatment

Surgery cures obstructive anatomic defects
Surgery is not indicated in nonobstructive phrygian cap

Operative Mortality

1.4 per cent

CHRONIC INFECTIOUS CHOLECYSTITIS

Surgery Indicated

Symptoms

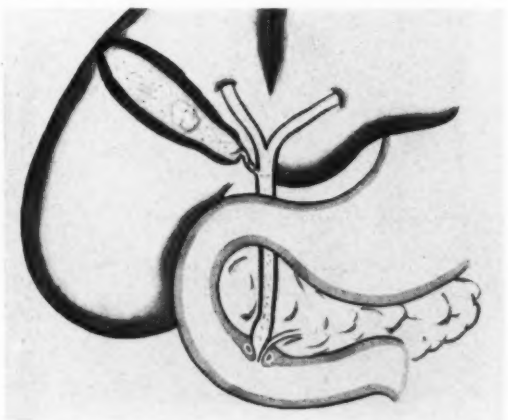
R. U. Q. recurrent distress
Fever—variable
Fat intolerance

Signs

Tenderness R. U. Q.
Hypochromic anemia
Loss of weight
Unexplained fever
Subclinical jaundice

Blood Chemistry

Icterus index 8-20 units
Otherwise normal



The bile and gallbladder wall are infected without common duct involvement.

X-ray

Duodenal Drainage

Free HCl gastric	Normal to low		
Bile	Duodenal	Mag. Sulph.	Olive Oil
Concentration	+	++	++
Crystals	+	+	+
Cultures	Positive*		

*E. Coli, B. Typhosus, Paratyphoid Group, Cl. Welchii, Streptococci, Staphylococci, B. Friedlander

Treatment

Cholecystectomy, if not delayed, results in cure

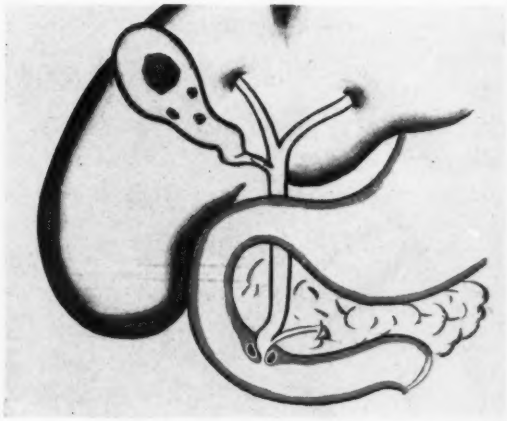
Operative Mortality

1.4 per cent

← *Faint visualization*

CHOLELITHIASIS WITH FUNCTIONING GALLBLADDER

Surgery Indicated



Metabolic stones may occur without infection of the biliary tract

Normal visualization with stones

Symptoms

R. U. Q. colic—intermittent
Associated symptoms: nausea, vomiting, belching, distention, fat intolerance

Signs

Physical examination
Tenderness R. U. Q.

Blood Chemistry

Usually normal

Duodenal Drainage

Free HCl gastric	Low to absent		
Bile	Duodenal	Mag. Sulph.	Olive Oil
Concentration	+	+++	++++
Crystals	Usually present		
Cultures	Usually sterile (85 per cent)		

Treatment

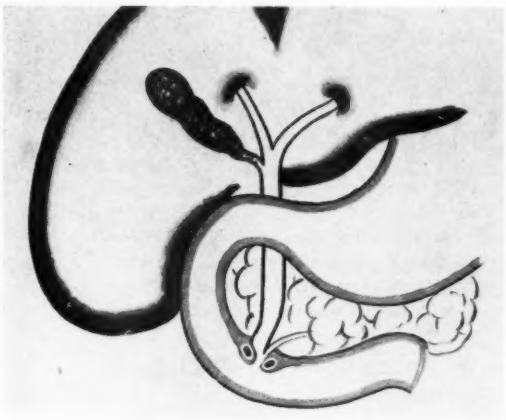
Cholecystectomy results in relief of colic. Associated hypertonic dyskinesia, if present, may require post-operative medical treatment.

Operative Mortality

1.4 per cent

CHOLELITHIASIS WITH OBSTRUCTION OF GALLBLADDER

Surgery Indicated



Nonfunctioning gallbladder with stones and thickening of the G. B. cystic duct

Symptoms

R. U. Q. colicky pain
Nausea and vomiting

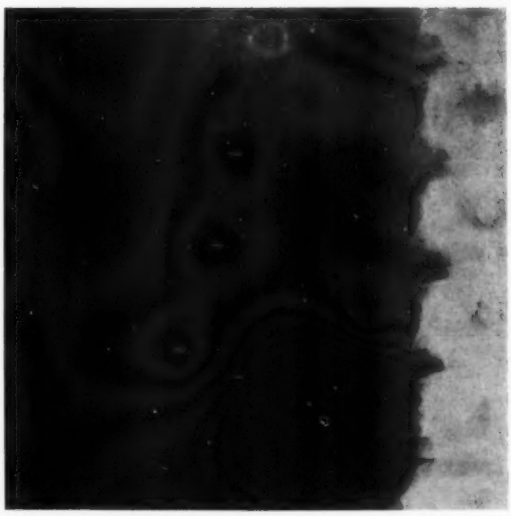
Signs

Physical examination
Tenderness R. U. Q.

Blood Chemistry

Normal

X-ray



No visualization with stones

Duodenal Drainage

Free HCl gastric	Normal to low		
Bile	Duodenal	Mag. Sulph.	Olive Oil
Concentration	++	++	++
Crystals	+	+	+
Cultures	Sterile (75 per cent)		

Treatment

Cholecystectomy, if not delayed, results in cure and stops progression to common duct involvement

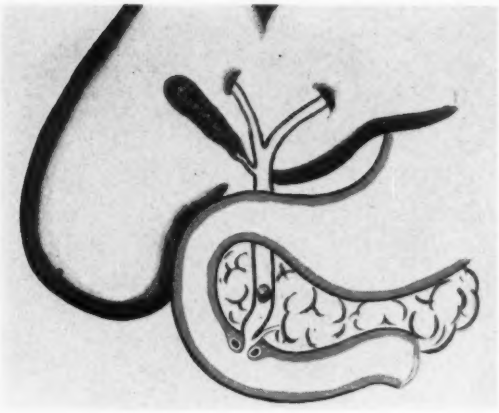
Operative Mortality

4.2 per cent

CHOLELITHIASIS WITH GALLBLADDER

STONES IN COMMON DUCT (Without Obstruction)

Surgery Indicated



Stone free in common duct

Duodenal Drainage

Free HCl gastric	Normal to absent		
Bile	Duodenal	Mag. Sulph.	Olive Oil
Concentration	+	++	+++
Crystals	+	+++	++
Cultures	Positive (74 per cent)		

Symptoms

Colicky pain { R. U. Q. / Epigastric / Precordial }

Nausea and vomiting

Fat intolerance

Signs

Physical examination
Not significant

Blood Chemistry

Normal

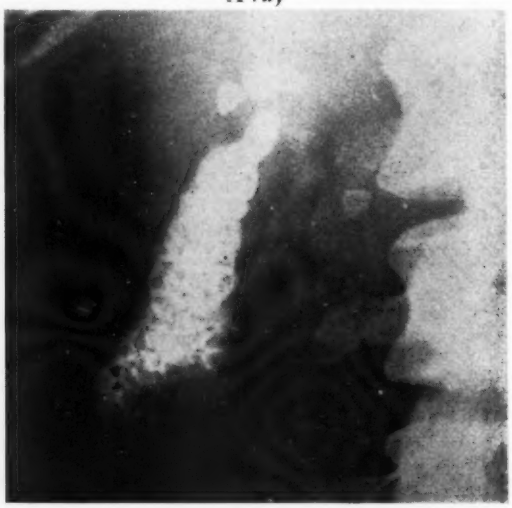
Treatment

Cholecystectomy results in early recognition of common duct stones; choledochostomy prevents further progression to chronic common duct damage, recurrent stones and biliary cirrhosis

Operative Mortality

11 per cent

X-ray



Gallbladder visualization stones in gallbladder and common duct

CHOLELITHIASIS WITH COMMON DUCT OBSTRUCTION

Surgery Indicated

Symptoms

Colicky pain { R. U. Q. / Epigastric / Precordial }
Nausea and vomiting
Pruritus
Jaundice

Signs

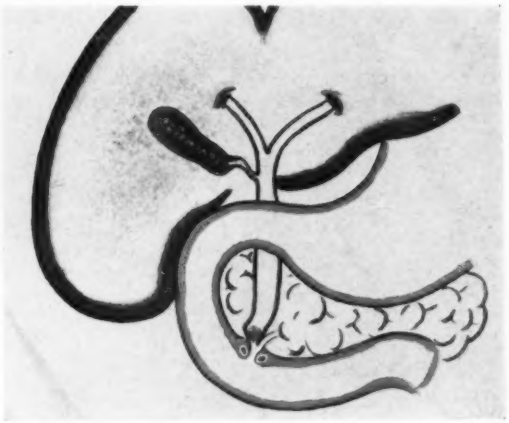
Physical examination
- Tenderness R. U. Q.
- Jaundice
- Clay colored stools
- Dark urine
- Palpable liver + or —

Blood Chemistry

Cholesterol—250 to 400
Cholesterol esters—125 to 200
Icteric index—15 to 200
Cephalin flocculation—negative
Thymol turbidity—<4 units
Alkaline phosphatase—7 to 15 units
A/G ratio—normal

Treatment

Cholecystectomy, with removal of common duct stones, to stop the progress of the disease



Stone impacted in common duct

Duodenal Drainage

Free HCl gastric	Normal to absent		
Bile	Duodenal	Mag. Sulph.	Olive Oil
Concentration	+	++	++
Crystals	+	+	+
Cultures	Positive (70 per cent)		

Operative Mortality

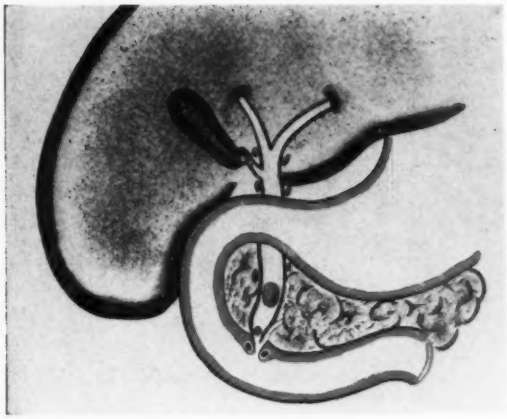
13 per cent

X-ray

Postoperative cholangiogram stones in dilated common duct

COMMON DUCT OBSTRUCTION WITH CIRRHOSIS

Surgery Indicated



Stones in gallbladder and common duct with infection of gallbladder, common duct, and liver

Blood Chemistry

Cholesterol—250 to 400
Cholesterol—trace to 100
Icteric index—15 to 200
Cephalin flocculation—3 to 4 plus
Thymol turbidity—4 to 10 units
Alkaline phosphatase—7 to 15 units
A/G ratio—inverted
Bromsulphalein retention—10 per cent

Duodenal Drainage

Free HCl gastric	Normal to absent		
Bile	Duodenal	Mag. Sulph.	Olive Oil
Concentration	+ to ++	+ to ++	+ to ++
Crystals	+ to ++	+ to ++	+ to ++
Cultures	Positive 70 per cent		

Operative Mortality

26 per cent

Symptoms

Colicky pain { R. U. Q. / Epigastric / Precordial }
Nausea
Vomiting
Bleeding tendency
Pruritus
Anemia
Loss of weight

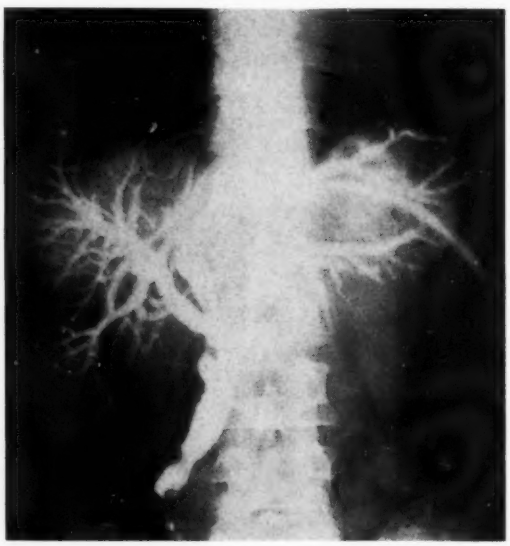
Signs

Physical examination
Tenderness R. U. Q.
Jaundice
Clay colored stools
Dark urine
Palpable { Liver / Spleen }

Treatment

Cholecystectomy. Removal of common duct stones with drainage.

Grave prognosis because of advanced infection of biliary tract and impairment of liver function



Cholangiogram chronic common duct obstruction

Men of Medicine

Swat the Fly!

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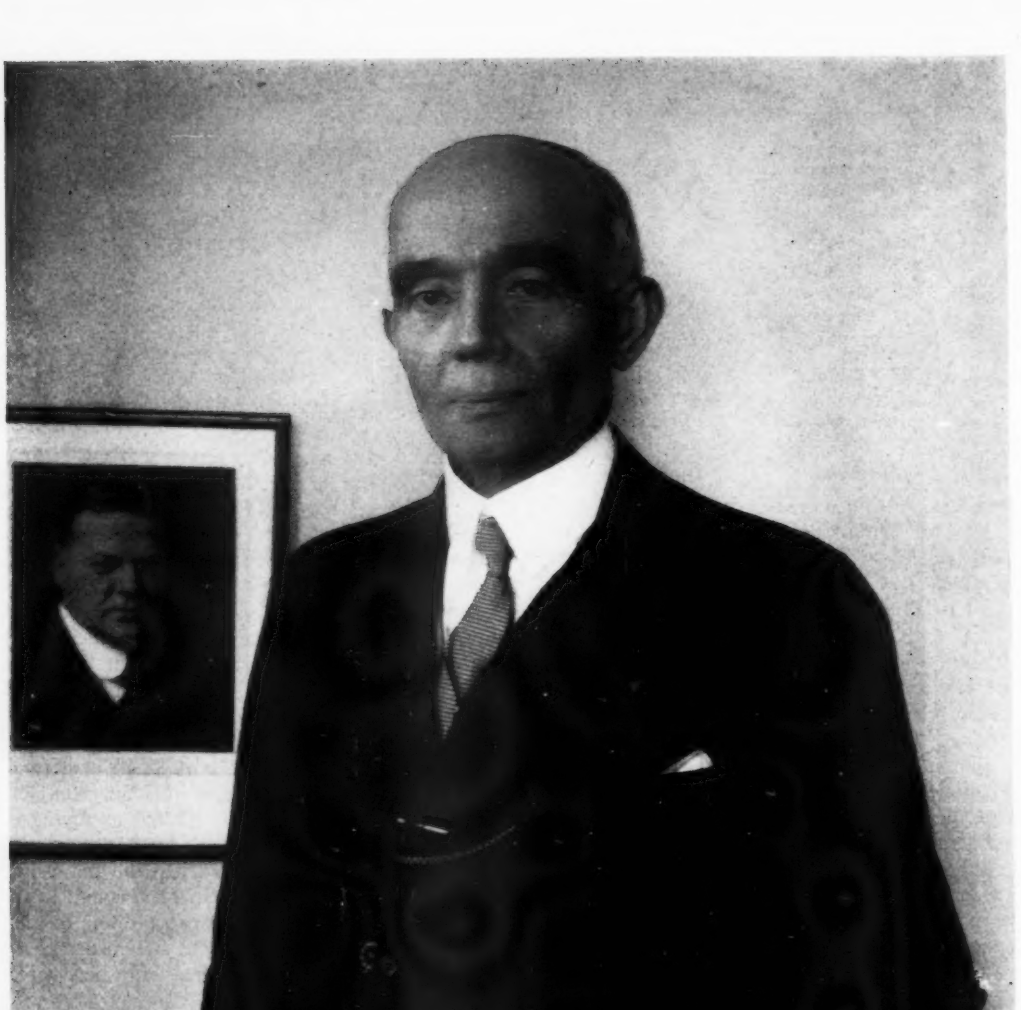
PART I

DR. SAMUEL J. CRUMBINE, a peppery, untiring little man of eighty-five, is the nation's most relentless worker in public health. Over a period of sixty years, his campaigns and inspirations have jarred the personal habits of every adult in the world, barring a few isolated aboriginals religiously dedicated to filth. Notably, Dr. Crumbine is the man behind the fly swatter, whose invention resulted from his thinking up the epochal mandate "Swat the fly!" The felicitous but simple phrase, born in 1905, swept around the world and made the Doctor, then Secretary and Executive Officer of the Kansas State Board of Health, a moderately famous man. In 1907, only two years after the flies received their nasty jolt, Dr. Crumbine issued a series of uproarious bulls against the common drinking cup. He began a crusade to eliminate it from trains, schools, office buildings, and other public places and brought about, within a few years, widespread legal bans, the appearance of the paper cup, and hosannas of unparalleled force for Crumbine.

The successes of Dr. Crumbine's early and middle years in no way lessened his ambition to keep the public on a robust footing. In 1923, bowing to a request from Herbert Hoover, who was then president of the American Child Health Association, he left Kansas, where he had laid about him with such antiseptic wrath, and came to New York, where he has led drives on behalf of privately supported health groups ever since. Recently, Dr. Crumbine completed his autobiography, "Frontier Doctor," a clean, lively narrative of eighty thousand words that he hopes will carry his sanitary doctrines to the head of the best-seller list. The composition of this document has taken him the better part of three years, during which his work in public health has been almost entirely advisory.

In the beginning, the publisher, Dorrance & Co. of Philadelphia, gave it a subtitle, "My Fight for Your Health," but the Doctor overruled it. The book's dust jacket includes a number of rather impressive tributes to him from public figures with whom he has been associated from time to time. For example, William Allen White wrote, "Along with the Kansas heroes—John Brown, Jim Lane, John J. Ingalls, Ed Howe, General Funston, and now General Eisenhower—the name of Dr. Samuel J. Crumbine should be written well toward the top, for his work was constructive, successful, and lasting. Kansas should honor him in its gallery of heroes." Dr. Thomas Parran, former Surgeon General of the United States, is quoted as saying of the author, "The example of his life and work and the spirit in which he approached the many and complicated health problems in Kansas and in the whole nation have been a great inspiration to me." These and other heart-warming statements please both Dr. and Mrs. Crumbine, who have great hopes for the memoirs.

Mrs. Crumbine, along with her husband, has found the piecing together of his history a rewarding experience. To assemble the data, it was necessary for them to spend long sessions reminiscing about their early married life, which, by any standards, was unusual. Few brides have joined their husbands under more inauspicious conditions. Right after their marriage, which took place at her home in Springfield, Ohio, her husband took her to Dodge City, Kansas, settling there in one of the most stimulating periods of that town's development. Dr. Crumbine is modest about his career in Dodge City, but the town recalls him reverently. Prominently on display in the Beeson Museum, which today houses Dodge City's leading collection of frontier memorabilia, is his obstetrical bag, together with a long eulogy on his



SAMUEL J. CRUMBINE

services to the community. "Crumbine was as well known around Dodge City as any gunman, and no gunman dared to cross him," one of his friends, a New Yorker in the paper-cup business, said recently. "His activities out there are unique in the annals of medicine."

Dr. Crumbine was born in 1862 in Venango County, Pennsylvania, during the height of the Battle of Antietam. The infant Samuel's father, the community blacksmith, spelled the family name with a "K," after the fashion of his German forebears, but the son later changed it, for reasons largely beyond his control. The children of the neighborhood, as children will, started calling him Crummie, with the result that during his formative years people for miles around, including the district schoolmaster, a clod, insisted on spelling his name "Crumbine." Mr. Krumbine went off to the Civil War some months before Samuel was born and was captured by the Confederates. A month before Samuel's birth, he died.

Several years later, Samuel entered a grade-and-high-school at Mercer that the State of Pennsylvania had established for the fatherless children of Union soldiers. While there, he took to hanging around the local drugstore and watching the pharmacist mix prescriptions. In the course of many such sessions, he decided to become a doctor. When he graduated from high school, at sixteen, he took a job in the drugstore at nearby Sugargrove run by a Dr. Phillips, who mixed prescriptions and also practiced medicine on the side. After three years there and two years at another pharmacy, Samuel had earned enough to enroll in the Cincinnati College of Medicine and Surgery. To pay his board, he circulated, after hours, handbills advertising Piso's Consumption Cure, a line of work that was as near in spirit to his studies as he could manage, and, as he has said since, not uncomfortably near, either.

By rigorous application, young Crumbine overcame his dubious premedical training at Sugargrove and made good grades. After a year, notwithstanding the handbills, he ran out of money, and went West looking for a job at which he could make enough money to come back and finish the course. In Spearville, Kansas, which he reached by freight train, by a hayrack, and afoot, he took employment in a pharmacy. As payment, he accepted a half interest in the place. The town had no official doctor, and the state had no medical laws, so he soon hung out a shingle and worked up a nice medical practice. He now believes that he practiced just as sound a grade of medicine as anybody else in that section of Kansas, and probably sounder. His calls took him with increasing frequency to Dodge City, eighteen miles distant, for which he formed a strong attachment. At that time—1885—Dodge City was widely conceded to be the unholiest community in the Western Hemisphere. A Chicago newspaperman had just written, "There is no law west of Chicago and no God west of Dodge City." A lot of the cattle shipped out of Dodge City were driven up from the Indian Territory and the Texas Panhandle by former members of the Confederate Army or their sons. As a consequence, in addition to the ordinary brawls of a lawless Western town, many gunfights developed during arguments over the Civil War.

After three years of practice in and around Spearville and Dodge City, Crumbine returned to medical school to pick up a few additional pointers. Back in Cincinnati, he cut quite a figure on the campus, his speech now being sprinkled with picturesque Westernisms, such as "ornery cayuse," "howdy, pardner," and "pull your freight." A little restless from his travels, he nevertheless buckled down to his studies, picked up where he had left off with the Consumption Cure, and this time made ends meet. During his junior year, he was introduced to the girl who was later to become his wife. One day, after sorting some handbills in his room in a boarding house, he dropped downstairs to complain about the towel situation. He found his landlady chatting with a young visitor from the Central Congregational Church. "My hands dripping," he has written in his autobiography, "I walked down the hall to the parlor, only to stop, aghast! With Mrs. Robinson was a red-cheeked, brown-eyed girl, a vision that left me breathless. Conscious of my wet hands, all I could do was stammer when I was presented." The girl was Miss Katherine Zuercher, who was preparing to be a missionary, and shortly thereafter she prevailed upon Crumbine to attend church regularly. At college, his church activities, despite a religious upbringing, had been hit-or-miss, because of his extracurricular involvement with Piso's, but he now found time for both work and worship.

What with his studies, his wooing, and the handbills, the lad had a loaded college career, but he graduated at the head of his class and received a

gold medal for exceptional scholarship. His years at Cincinnati comprised, he says, a queer period, and one perhaps illustrative of the life cycle: During class hours he gained knowledge that doubtless saved many lives later on, and after hours he evened things up with the Consumption Cure.

Dr. Crumbine and Miss Zuercher were married a few months after his graduation, and left for Dodge City. In her wildest dreams of missionarying, the former Miss Zuercher had never looked forward to anything quite like her new home.

One of Dr. Crumbine's first cases, after he and his bride had settled in a six-room cottage in Dodge City, called for his treating a rancher, thirty-five miles from town, for a broken leg. Summoned by a cowhand messenger, the Doctor rode out, set the bone, applied splints, and prepared to return home. The rancher, a bluff, well-met man, thereupon took a Springfield rifle from its resting place on a pair of antlers and said, "Set down, son." His foreman locked up the Doctor's horse, and the rancher, at rifle point, made Crumbine stay overnight. The sufferer was nervous about complications. The next day, after his prisoner, a little unstrung, had been allowed to ride back to town, the rancher sent a cowboy in to settle the fee with a good-sized payment in gold. It came in handy, since many of the farm patients paid, in accordance with local habit, in meat, poultry, and eggs.

From all accounts, Dr. Crumbine became vastly more self-confident after a few months in Dodge City. There are indications, in fact, that he got to be downright aggressive. At that time, it was the custom of physicians to wear Prince Albert coats and plug hats; Dr. Crumbine frequently added to this mild garb a six gun, slung on a cartridge belt. He wore it chiefly on visits to the saloon district and during periods of undue stress, such as the cattle-shipping season. "I had to go armed for a while and walk in the middle of the street," he says in his autobiography. "Fortunately, the City Marshal was a patient of mine, so I was also protected by him."

A curious relationship grew up between the marshals and Dr. Crumbine. There can be no doubt that the marshals found Dr. Crumbine an entertaining addition to the frontier. Dodge City as a whole, including the lawless element, viewed Dr. Crumbine with affection and indulgence. He indiscriminately bawled out wrongdoers, fixing on gamblers, killers, drunkards, and prostitutes for his most sulphurous tirades. The theme of his message was usually good health rather than morals, with a footnote to the effect that he was too busy for nonsense.

Because Dodge City was the only big town in an area of seven counties, Dr. Crumbine was obliged to travel a lot. On short trips, he rode horseback; on longer journeys, he drove in a buggy. When he used a buggy, he always took a shotgun along and stopped on the way back to hunt prairie chickens, plover, and rabbits, occasionally also getting a shot at a coyote or a wolf. By 1890, the Rock Island Railroad had a spur line to the neighboring town of Bucklin, on which the Doctor made a trip every week or so. Dr. Crumbine is still very fond of hunting, but he gets little opportunity to go after game these days, owing to the lack of cover around Jackson Heights.

Dr. Crumbine always found wonderful variety in his cases, too. During one period, his community had no dentist, and he did the local dentistry, often proceeding more or less by ear. One emergency call, which he savors in retrospect, took him to a young cowhand who was suffering from a powerful toothache. Dr. Crumbine investigated and decreed that an offending molar would have to come out. After a lengthy wrestle, he succeeded in extracting a tooth with his forceps, but it was a next-door neighbor of the damaged molar and in excellent shape. When the cowboy learned the truth, he gave Dr. Crumbine a spirited dressing down. "I was obliged to listen to a lambasting such as few men have ever heard," he says. However, by this time the Doctor was adjusted to the frontier method of making the best of things, so he suggested that they pop the tooth back in. The cowboy submitted, and Dr. Crumbine, after some trouble, went through the operation in reverse. The cowboy came into the Doctor's office the next day with a badly swollen jaw, but he was persuaded to keep cool, and, as far as Crumbine knows, he still has the replanted molar. The Doctor took the bad one out later on. "I read of a similar case in a medical journal a few years ago," Dr. Crumbine says. "The man claimed it was the first on record."

Much of Dr. Crumbine's work consisted of trying to prevent alcoholism among babies. The frontier was badly cluttered with medicine shows and assorted quacks. There were hundreds of concoctions to relieve pain, many others to "prevent

babies from crying," and still others for tuberculosis, fractured skulls, leprosy, and so on. The nostrums, handsomely labelled, ranged in price from a nickel to a dollar, and a bottle usually entitled a purchaser, at no extra cost, to some utensil like a razor, a telescope, or a combination nutpick, kerosene strainer, and shoehorn. The baby remedies were not falsely advertised; they actually did prevent the prescriptees from crying. The way it worked was that the medicine was about 50 per cent alcohol, and after three or four pulls from the bottle an infant was in no humor to cry out but was, in fact, drunk. Dr. Crumbine both campaigned against the sale of these tonics and treated children who took them. He has always enjoyed an occasional quiet drink, but he is far from sold on the therapeutic value of whiskey.

In the course of his varied days, he sometimes dropped into a Fred Harvey diner that had been opened in Dodge City. Like other restaurants of the time, those in the Harvey chain dispensed milk from open jugs or pitchers. The method, to Dr. Crumbine, seemed faulty from a health standpoint. After several conversations, he persuaded the Harvey general manager, whom he visited in Kansas City, to provide diners with milk in individual bottles. It was the first time, many members of the medical profession believe, that milk was ever sold in this way. It was also Dr. Crumbine's first notable accomplishment in public health, though most of his work was beginning to take on a crusading complexion. A small campaign, as public-health campaigns go, it paved the way for his later assaults on the flies, the public drinking cup, and many other enemies of society.

Dr. Crumbine in 1908 when he was State Health Officer of Kansas.

PART II

DR. Samuel J. Crumbine's career as a public-health officer began in Topeka on June 2, 1904, a date hallowed in Kansas and esteemed by doctors everywhere. His medical practice, in and around Dodge City, had become so doggedly crusading that the State Board of Health called him in as secretary and executive officer. He proved to be a good choice. For the next nineteen years, he was to rage over Kansas like a tornado, obliterating plague spots and sweeping aside miscellaneous opposition. "Dr. Crumbine is a deceptively mild man," a former associate of his said not long ago. "When he says no, most people think he means maybe. What he actually means is 'Hell, no!'" Kansas has taken steps to perpetuate the memory of Dr. Crumbine. The state is liberally sprinkled with plaques and statues commemorating him, and a week, dedicated to cleanliness, was set aside each year for many years as Dr. Crumbine Week. A while back, the Doctor, who is now eighty-five, journeyed from his home in Jackson Heights, to Topeka to attend a monster banquet in his honor. He made a speech in which he came out strongly in favor of good health, and had a look at a plaque lately put up in his honor in the statehouse. Of violently graphic design, it shows him locked in a deadly wrestle with a child over possession of a drinking cup, a reminder of one of his boldest campaigns.

Dr. Crumbine's decision to leave Dodge City was influenced by a rapid deterioration of that restive center in the late nineties. For one thing, a drought unparalleled in the history of Kansas set in. It lasted four years, and depopulated the Dodge City region. The cattlemen moved their rail shipping point farther west; the gamblers, prostitutes,

gunmen, and other professional people who formed the backbone of the community followed the cattlemen; and the peak of Dodge City's notoriety, and of its frontier prosperity, was past. From the beginning of his career in the West, Dr. Crumbine had been paid partly in barter, but the depression caused new lows in his cash collections. He still has his ledgers for the Dodge City days. In 1894, a J. D. Brown, up and around after a siege of rheumatism, settled his bill with a pair of cuff buttons, which he valued at twenty cents, a copy of "Pilgrim's Progress" ($3.50), and a book called "Congress of Religions" ($3.75). In 1897, a Mrs. R. H. Marion settled her account with a sixteen-and-a-half pound ham, at the market rate of eleven cents a pound; Tom Ellis, of nearby Kingsdown, paid off with forty bushels of barley, at thirty-five cents a bushel; and J. Gilbert, of Spearville, turned over three dollars' worth, or seventy-five pounds, of tomatoes.

In his last two years at Dodge City, Dr. Crumbine functioned part-time, and without pay, as a member of the State Board of Health, having been appointed by the governor, on the recommendation of a judge whose baby he had brought through a critical illness. With characteristic dispatch, the Doctor dug into the work and thought up various innovations. One incident, which he has since called the deciding factor of his life, arose from rumors of a mysterious epidemic at Pratt, a Kansas division point on the Rock Island Railroad. Receiving a telegram from the Board to proceed and investigate, the Doctor went to Pratt and examined practically everybody in town. He found fifteen people suffering from what he diagnosed as smallpox and many others who had been exposed. At that time, the only known way to combat a smallpox epidemic was to round up the infected persons, lock them in a pesthouse, where they could either thrive or decline, as God willed, and quarantine the rest of the town.

Dr. Crumbine decided to make a start toward eliminating the pesthouse from the American scene. He addressed the citizens at a meeting, saying that, to keep the railroad, schools, and businesses operating, he planned to quarantine to their homes the fifteen cases, then vaccinate and release those who had been exposed, on condition that they report to a health officer twice a week. It was an unpopular idea. Most of the smallpox victims, and many of the exposed persons, talked bitterly against him. "We want to be locked up in the pesthouse," they would cry, and threaten to run him out of town. But he stuck to his guns, and the epidemic subsided. Dr. Crumbine, now completely won over to the cause of public health, received statewide publicity, most of it commendatory, for his harsh treatment of the pesthouse. The Board was much impressed; it followed his system in another smallpox outbreak and made plans to obtain his services as secretary and executive officer.

In 1904, when Dr. Crumbine went to Topeka to take his new job, the Board was somewhat hampered financially. The appropriation for that year, for all purposes, was $3,080, and, according to a Kansas statute, the Board's annual expenditure could not, under any circumstances, exceed $5,000. Dr. Crumbine had the statute amended so that no ceiling was specified; he also wangled through the legislature a pure-food-and-drug bill, as well as a water-and-sewage law. Then, having been given the funds he needed, he launched an exhaustive snooping campaign and began to print a monthly bulletin. Principally, he was interested in advertisers' statements about food and drug products. "We had to blaze our own trails," he says. "In that period, people would believe anything, buy anything, eat anything, drink anything—and with the sorriest kind of results." He had the Board's chemist analyze most of the foods and drugs sold in Kansas. The findings, published in the bulletin, made interesting reading. For example, Dr. Turner's Shaker Neurogen, guaranteed as "an absolute cure for all nervous troubles," was found to contain 75.3 per cent alcohol and little else of importance. Dr. Crumbine declared against Turner's, though he had talked to several people, formerly quite jumpy, who had found the stuff a specific for their condition and were forcing themselves to swallow close to a bottle a day. The assertions in behalf of Cook's Gold Bond Oil, according to the Doctor, took in too much territory. "Claims to be a cure for eighteen diseases, some of which are ordinarily considered incurable," the bulletin reported. Trying to be fair, Dr. Crumbine concluded that since the oil contained a high percentage of turpentine, it might be useful in thinning paint. Dr. O. P. Brown's Blood Purifier was tossed out almost automatically, since, as the bulletin said, it "claims to be a cure whenever everything else fails." Burk's White Pine Balsam, "a cure for all throat, chest, and lung diseases," was adjudged of only ephemeral value, leaning, as it did, pretty heavily on chloroform.

Besides the patent medicines, many foodstuffs came in for censure by Dr. Crumbine and his analysts. A popular brand of gingersnaps sold by a Chicago manufacturer was denounced because the cookies contained broom straw, splinters of wood, and mouse hair. The company complained that it was being persecuted. A well-known pepper turned out to be ninety per cent ground olive pits, and several other spices were found to be made up in large part of powdered bran, which was less expensively available as horse feed. Dr. Crumbine attacked the practice of preserving canned foods with benzoate of soda, on the theory that if you ate too much of this commodity, you were likely to wind up in feeble health. Eventually, the Health Board decreed that in Kansas no foods containing more than one-tenth of one per cent benzoate of soda would be allowable, and that its presence must be announced on the label. Shortly thereafter, a controversy over preservatives developed in the federal Department of Agriculture. It was settled, a few months later, by the passage of the Food and Drugs Act, which included a compromise substantially like Dr. Crumbine's regulation. The Doctor also abolished sidewalk displays of all foods that did not have to be cooked or peeled before they were eaten.

At this point, Dr. Crumbine and his associates viewed their progress so jubilantly that they threw a large dinner in celebration. In the jolliest humor, the fellows ate heartily of whitefish, then went to bed painfully ill with food poisoning. When Dr. Crumbine got up, he indignantly looked into the business of food shipment. For some time after that, he searched for evidence of negligence, concentrating especially on oysters, because of their lacklustre, water-logged taste in Kansas. At length, he was visited by a former patient, a railway mail clerk, who related an anecdote of sufficient strength to start a campaign with. Two express messengers on his train, he said, were re-icing a barrel of oysters and accidentally turned it over. By chance, many of the oysters came to rest on the back of a fairly clean-looking dog, so the expressman carefully swept them up, threw them back in the barrel, and heaved a cake of ice in on top of them. Dr. Crumbine, delighted with the news, promptly charged the express company whose employees had done the re-icing with violating the new food-and-drugs law. "The officials were very cooperative," he says. "They agreed that oysters off a dog's back were not quite up to scratch." In a meeting with company officials, he laid down a list of rules governing the shipment of sea food; chiefly, they provided that wooden barrels be replaced by metal containers and that the food be refrigerated by ice packed in a walled compartment of the containers. The Doctor takes great pride in the fact that Kansas, unfruitful, as it were, of oysters, should be the first state to establish rules for the shipment of oysters.

By 1910, Dr. Crumbine, through his unprecedented crusades, was acquiring a national reputation. In *Collier's,* Samuel Hopkins Adams and Mark Sullivan paid indirect compliments to his principles in a series of articles exposing fraudulent nostrums, and Edward Bok started to make similar revelations in the *Ladies' Home Journal.* The American Medical Association, stimulated in part by the ideas Dr. Crumbine had set loose, undertook an investigation of patent medicines that was to last for years. William T. Sedgwick, an internationally famous sanitarian and a professor at Massachusetts Institute of Technology, wrote Dr. Crumbine, "The steady, regular, persistent work of men like you makes us professors envious, and . . . we begin to wonder what professors are good for, anyhow."

The Doctor also came in for a lot of colorful abuse. A number of communications from food and drug manufacturers to Governor E. W. Hoch, of Kansas, demanded that Dr. Crumbine be removed from office and, if convenient, ridden out of the state on a rail. Some of the manufacturers sent a politician to talk to the Governor, who, like the other workers in the Topeka statehouse, was enjoying watching the Doctor in action. The Governor gave the politician a half-humorous lecture on ethics and handed him his hat. The manufacturers then had a lawyer call on Dr. Crumbine. "We're planning to sue," the lawyer told him. "You're interfering with legitimate business." The Doctor, who was busy examining some brackish dill pickles, took him out in the hall. "You want to file a suit?" he said. "Two floors down, third door on the right." A few days later, the manufacturers approached Cecil Howes, the statehouse reporter for the Kansas City *Star,* as a possible intermediary for bribing Dr. Crumbine. Howes told the story to Dr. Crumbine, who thanked him, shook hands hurriedly, and rushed off to examine the Kansas River, from which Topeka drew its

municipal water supply.

Dr. Crumbine was at that moment interested in testing the validity of the old and popular belief that a running stream purifies itself every seven miles. He persuaded a fellow-scientist, Professor M. A. Barber, of the University of Kansas, to knock off work, then borrowed a skiff that wasn't padlocked and, establishing the Professor on the middle thwart, pushed out into the river. "We'll run down to Lawrence," he yelled to his companion, who, not overly familiar with boats, was trying to row upstream with one oar. "It's only twenty-eight miles." Mechanically, the trip didn't go very well. For one thing, Professor Barber was accustomed to the cloistered life of the classroom and he kept complaining about the sun. For another, the river was quite low, with the result that they got stuck on a sandbar only a few hundred yards below Topeka. They dug out in about an hour, both men toiling in mud and water up to their waists, but it was an area of sandbars and they got stuck every fifteen or twenty minutes thereafter. By nightfall, they had covered several miles, and they laid over at a farm. "Professor Barber kept saying that he was on fire," Dr. Crumbine recalls today, "and, do you know, I examined him and he was, in truth, pretty badly burned?" Next morning, the Professor was able to arise only with assistance. Dr. Crumbine applied medication for second-degree burns and walked him around the chicken yard for a while. When the Professor was asked if he wished to throw up the trip and return to town in a horse cart, he replied, "I will proceed to Lawrence by boat if the trip takes two and a half years." Dr. Crumbine and the farmer got the Professor on the thwart again, after a little trouble, and that day things went better. Avoiding as high as fifty per cent of the sandbars, they took hundreds of samples of river water. Toward Lawrence, however, a gale came up and nearly blew them over a mill dam, all but capsizing the boat. They eventually got to shore and went about analyzing their samples.

The expedition proved that the river was badly polluted and that the adage about running streams' purifying themselves was humbug. On the strength of their findings, Dr. Crumbine persuaded the legislature to take steps to keep pure all the rivers in Kansas; he later began agitation that resulted in several states', in both the Middle West and the East, cooperating to set up sanitary control over boundary rivers.

DR. Crumbine's first campaign of international significance took place in 1905, one of the most memorable years of his life. For some time, he had felt a gnawing antagonism toward the fly. He had been convinced by a friend, Dr. Victor C. Vaughan, who, with Dr. Walter Reed and Dr. Edward Shakespeare, had been asked to serve on an Army commission to study typhoid fever during the Spanish-American War, that flies were among the principal offenders in transmitting typhoid bacteria. Dr. Crumbine determined to bring about the downfall of flies in Kansas. It was a difficult order. He went through the motions of distributing literature denouncing flies, but it was received with apathy.

Meanwhile, typhoid fever was on a sharp upswing throughout the country. The Doctor was at his wits' end when, on a pleasant spring afternoon, he attended the opening game of the Topeka baseball season. The local team was pitted against Wichita, a deadly rival. In the last half of the ninth, with the score tied at two all, Topeka got a man down to third base. Several persons in Dr. Crumbine's section began to scream helpful suggestions at the succeeding batter. "Sacrifice fly! Sacrifice fly!" called a man on his left, while a man on his right yelled, "Swat the ball!" Suddenly, Dr. Crumbine leaped out of his seat, shouted, "I've got it!" and left the park like a shot out of a cannon. To this day, he has no idea who won the game. Back at his office, he put into motion plans for a gigantic campaign centering on the slogan, "Swat the fly!" It attracted notice immediately. A few days later, a schoolteacher in Weir, Kansas, a scandalously unsung hero named Frank H. Rose, came to the Doctor with a crude implement made of part of a yardstick and a square piece of wire screen. He said he called it a "fly bat." Dr. Crumbine thought for a moment, then said, with historic simplicity, "Let's call it a fly swatter."

The popularity of both the slogan and the instrument spread across the country and throughout the world. The slogan became a permanent part of the vocabulary. Dr. Crumbine simultaneously spoke out vehemently in favor of screens and of cleaning up filth. Flies died by the thousands. "The campaign made me a reputation—of a peculiar sort," he said the other day. "From then on, I was known to doctors everywhere as Swat the Fly Crumbine."

Once the flies were put in their place, Dr. Crumbine opened up on tuberculosis. The disease had

been worrying him for a long time; its incidence in Kansas was increasing, and no effective measures were in force to control it. Tuberculosis sufferers were not compelled by law to report their condition, and often they went about business as usual up to the last, crippling stage of the illness.

One morning, riding a Missouri Pacific train across Kansas, Dr. Crumbine sat looking at his fellow-passengers with sorrow. Several of them were manifestly "lungers," as the term was then. He watched two or three emaciated, feverish men walk to the end of the car and use the drinking cup that hung there on a chain. Then a little girl used the cup. As at the ball game, Dr. Crumbine sat up, electrified. The train conductor was on the point of taking a drink when the Doctor dashed down the aisle, waving his arms wildly, and called out, "Hold! Hold! *Damn* the common drinking cup!" And he snatched the offending vessel off the wall, chain and all, and threw it out an open window. The conductor and the passengers were nonplussed not to say irritated. Their mystification was cleared up in almost no time.

Once back in Topeka, Dr. Crumbine began a campaign that in 1909 succeeded in outlawing the common drinking cup in Kansas. It was the first such action in history, and it not only caused a sensation but aroused a lot of opposition. Shortly after the law was passed, a remarkable thing happened—an incident in which Dr. Crumbine suspected divine intervention. A young man named Hugh Moore, Kansas-born but living in Boston, called on him at the statehouse. The visitor had with him some little cone-shaped paper cups. "I thought these might solve your problem out here," he said. Dr. Crumbine seized his hand and wrung it, crying, "Young man, you will go far!" Moore is now chairman of the board of directors of the Dixie Cup Company and frequently meets with the Doctor to reminisce about the common-cup campaign.

Heartened by his success, Dr. Crumbine went on to abolish roller towels in public places. He and his bacteriologists examined roller towels from six cities in Kansas and found several containing germs of many communicable diseases. Then he thought up a catchy new slogan, "Don't Spit on the Sidewalk." Like "Swat the Fly!" it was destined to travel around the world and live through the ages. It got off to a slow start, however. But, as usual, Dr. Crumbine persisted, and even the most remorseless tobacco chewers eased off a little. The total effect of Dr. Crumbine's blows at communicable illness was very encouraging; tuberculosis, smallpox, syphilis, and several more diseases fell off sharply in the next few years in Kansas. Another cheering result was that other states, and even other nations, began to follow his example.

For some time, Dr. Crumbine had felt that the federal government should provide more aid to the states for public health. To coordinate the work of health officers in a backward and neglected region of zinc and lead mines, he petitioned Washington to make three adjoining counties in the states of Kansas, Missouri, and Oklahoma a federal sanitary district and appoint a full-time administrator. To his surprise, the federal government took favorable action on the request, after a dignified passage of time. A young doctor named Thomas A. Parran, Jr., was put in charge. During the next few years, Dr. Crumbine worked with Dr. Parran to clean up the district; later, when Dr. Parran was Surgeon General of the United States, Dr. Crumbine offered him friendly suggestions from time to time. As Dr. Crumbine's fame spread, he was called upon to sit in at various important health councils. In Washington, in 1908, at the International Congress on Tuberculosis, to which four thousand delegates came from thirty-three nations, he was appointed a member of the Central Committee.

During Dr. Crumbine's tenure as head of the public health department in Kansas, which lasted from 1904 to 1923, he instituted measures that became patterns for health authorities all over the world. He worked hard, but he often found time hanging heavy on his hands, so from 1911 to 1914 he also functioned as dean of the School of Medicine at the University of Kansas. "William Allen White persuaded me to take the job," the Doctor says. "He dropped into my office at the statehouse one day and said that the students were ignorant about public health. I signed up the next day." The job, he felt, came at an opportune time, for he was able to keep his charges posted on a couple of new campaigns he had set in motion.

One morning, having heard some disturbing rumors, Dr. Crumbine and a group of hawk-eyed associates dropped unannounced into the state prison, in Lansing. The warden hinted that they had committed a social blunder, but the Doctor demanded that he and his associates be housed for

a week in the style to which the prisoners were accustomed. The group ate the prison food for several days, then unequivocally pronounced it lousy. In addition, they made recommendations, later carried out, for better hospital facilities, a separate pavilion for tuberculous convicts, increased medical services, a health check on new prisoners, the abolition of contract labor, and an eight-hour working day.

During the first World War, Dr. Crumbine helped the War Department control prostitution and keep down venereal disease in the Southwest. He is not sure whether the high point of this campaign was reached when he conceived a new slogan, "If a Chicken Smiles at You—Safety First!" or when he threatened Boss Tom Pendergast in Pendergast's own office. The Doctor was outraged because Pendergast, who felt that bawdy houses were a harmless stimulant for business in general, had ordered the Kansas City police to leave prostitutes alone. Dr. Crumbine called on Pendergast and said, "I will give you exactly one week to resume arrests and begin medical examination of all prostitutes. If you don't comply, I'll have the Surgeon General put Kansas City out of bounds for every soldier in the Army till the war's over." "A week!" cried Mr. Pendergast. "Why, Doctor, I'll have it done by tomorrow."

In 1923, several years after Dr. Crumbine had organized a division of child hygiene and begun a drive to lower infant mortality in Kansas, Herbert Hoover, then president of the American Child Health Association, persuaded him to come to New York as medical consultant for that organization. The Doctor and his wife found the East filled with jangling crudities after the halcyon life in Dodge City and Topeka, but they settled down, sportingly determined to rough it, and rode subway trains and buses, swallowed gasoline fumes, and fought the crowds with flinty resignation. "Oh, we were soft at first," he says, "but we toughened up in no time. A Kansan can get used to anything." It was easier for him because much of the time his work took him out of town, into all parts of the country. He began by undertaking a nationwide safe-milk campaign; he assembled the first milk laboratory in an automobile and drove it into areas where the infant-mortality rate was high. There he would talk about milk and demonstrate how it could be made safe by pasteurization. This gave great impetus, on a national scale, to the pasteurization movement in the United States.

After he had cleaned up the milk in various unsanitary backwaters, the Doctor had a look at the colored-midwife situation in the South. It was, he reported, hygienically dispiriting. In several states, he began campaigns that ended in the elimination of untrained midwives. His services were uniquely valuable in such campaigns, since, by that time, he was acquainted with the public health officers in nearly every state.

In the Association's New York offices, which, after several moves, were established in Rockefeller Center, Dr. Crumbine became noted for his galvanic behavior at conferences. The truth was that he disliked conferences, and he still does. He was able to tell what was afoot after a minute or two, and then he would pick up his hat, say, "Splendid, I'll get started right off," and head for the door. "But Doctor," his colleagues would cry, "the meeting's just assembled!" Excessive talk makes him nervous, in spite of which he consented to appear once a week for a number of years on the N.B.C. radio program entitled "Cheerio," with a series of discussions on child health. He did not feel drawn to this line of work, and as soon as he could gracefully manage it, he withdrew to take to the field. In 1925, Dr. Crumbine was made general executive of the Association. About five years later, at President Hoover's request, he took a leave of absence to conduct, for the government, an inquiry into child health in Puerto Rico. After several months spent tramping through cane and rice fields, in the course of which he looked into thousands of native huts, he presented his findings in a long, impressive document that a professor of public health at Yale described as "a classic report."

The American Child Health Association was dissolved in 1936, and in 1938 Dr. Crumbine became child health consultant for the Save the Children Federation, a similar privately supported group, for which he concentrated on underprivileged children in the nation's Southern mountain regions. It is the Doctor's theory, and the Federation's, that the mountaineers, having the highest birth rate in the country, constitute our most important source of population and, in consequence, warrant a good deal of looking after. He prepared an exhaustive treatise on the mountain children that is in use as a textbook in several universities. A few years ago, Dr. Crumbine, supported by the American Federation of Labor, succeeded in hav-

ing Congress proclaim May 1st Child Health Day. The date is celebrated with parties in schools and for a time was noted in the *Congressional Record*.

At eighty-five, Dr. Crumbine considers that he has any number of first-rate campaigns left in him, some of them possibly evocative of slogans. He and his wife have a married daughter, who lives near them in Jackson Heights; they had a son, Warren, who died in 1916 of pneumonia, in China, where he was manager of an egg-packing plant. Mrs. Crumbine has been in poor health of late, and her husband does most of the housework. He still finds time to play golf once or twice a week, usually with a retired Y.M.C.A. secretary, a former professor of chemistry, and an engineer for the city water supply, all of whom live in his neighborhood. He plays an uncommonly hasty game, proceeding in a kind of shuffling trot from stroke to stroke, and en route keeps a lookout for faulty sanitation, such as clogged-up drains, stagnant water traps, and excessive spitting. When Mrs. Crumbine is feeling well, she and the Doctor attend movies fairly often. His work with his recently published autobiography has set him to brooding about the West; he springs eagerly on scraps of news from Kansas. He is much gratified to hear that the Missouri Pacific Railroad, on one of whose trains he began perhaps his greatest crusade, is planning to name a Pullman after him. It will be equipped with paper cups.

METHADON ADDICTION

THERE is evidence of increasing use by drug addicts of the new synthetic drug, methadon (6-dimethylamino-4,4-diphenyl-3-heptanone, also known by the trade names "dolophine" and "adanon") to gratify drug addiction. The result of a special observation of this trend in one district—which can be considered as substantially representative of the general trend in all districts—shows that most of these addicts are obtaining their supplies of "dolophine," for example, through narcotic "prescriptions" issued by registered practitioners. While this special observation related to use of the drug under the name "dolophine," the irregularities can be considered likewise incident to the use of methadon or "adanon," which are, of course, other names for the same drug.

An investigating officer of this Bureau learned from a number of addicts that methadon has the same effects on them as morphine or heroin with but two exceptions: (1) On administering morphine or heroin hypodermically they experience what they describe as a tingling sensation, which is absent in the use of methadon. (2) The withdrawal symptoms experienced on the removal of methadon are not as severe as those symptoms experienced on the removal of heroin or morphine. However, the methadon withdrawal symptoms are very definite. The general over-all effect of methadon satisfies the craving of the morphine and heroin addict with the same disastrous results.

It was also found that a majority of the narcotic addicts are now requesting physicians to prescribe "dolophine" for them instead of asking the physician to prescribe morphine. The addicts claim that when they approach a physician and furnish him with fictitious symptoms of some condition which may require narcotics, if they request or suggest morphine the physician immediately classes them as narcotic addicts. Under these circumstances the physician proceeds with caution and usually refuses to prescribe for them. However, they have found that if under similar circumstances they request "dolophine" instead of morphine the physician will usually prescribe for them. When these addicts are again in a position to purchase morphine or heroin from the illegal channels they resume their use of these narcotic drugs.

The officer also found that a majority of the physicians interviewed were under the impression that methadon was not habit forming and therefore they prescribed methadon more freely and in larger quantities than morphine or other opium derivatives. Among the physicians in general it was found that they were not adequately informed regarding the addiction-forming qualities of methadon and in some cases were misinformed about the action of the drug. *H. J. Anslinger, Commissioner of Narcotics, Washington, D.C.*

The Medical Bookman

PRACTICAL THERAPEUTICS*

MODERN medical textbooks covering a field as vast as the science and art of therapeutics are seldom the fruit of one man's wisdom. The usual practice followed is the establishment of an outline by a senior editor and the clothing of that skeleton by many experts. "Practical Therapeutics" by Martin Emil Rehfuss adheres in general to this plan but differs from all previous texts in a unique fashion. Quoting from the preface written by Dr. Rehfuss:

"For some years I have assigned to each student a particular subject in the field of internal medicine. These contributions were then reviewed by members of the department best fitted to do so, revised, edited, mimeographed and given to the entire class."

We find, therefore, explicitly that the basic manuscripts that fathered this work actually flowed from the pens of medical students themselves.

The book is intended specifically to serve as the text in the courses in therapeutics in the department of medicine at Jefferson Medical College. It is a first edition, but there have already been several mimeographed "editions." The primary consideration in its compilation was to find the best method of presentation of the subject to medical students. Its approach is fundamental; it presupposes no previous medical knowledge. It begins at the beginning of medicine, that is to say, on the foundations of anatomy, pathology, and physiology. Although the needs of the medical student are the first consideration, many physicians in practice will find this work very useful to their own needs precisely because the work is anchored to fundamentals.

There are four general divisions of the material:

1. General Therapeutic Principles.
2. Symptomatic Therapy.
3. Treatment of Specific Disorders.
4. Special Treatment.

Apparently most of the first two sections is taken up in the junior year at Jefferson Medical College and the last two sections in the senior year.

The section on general therapeutic principles is an elementary discussion of materia medica and the proper approach to a diagnostic and therapeutic problem. Although the text is one of therapeutics, the authors appreciate the dependence of therapy upon diagnosis, and diagnostic procedures and differential diagnoses bulk fairly large in the discussion of symptomatic therapy.

Section II consists of one hundred pages of symptoms presented alphabetically and distilled practically to the point where this reviewer imagines that the entire section was originally set up as charts of the particular symptoms discussed. There are many diagrams in this section similar to the illustrated plate 9, "Sites of Visceral Referred Pain." The introduction to the chapter on pain is a collection of medical aphorisms, beginning with the quotation:

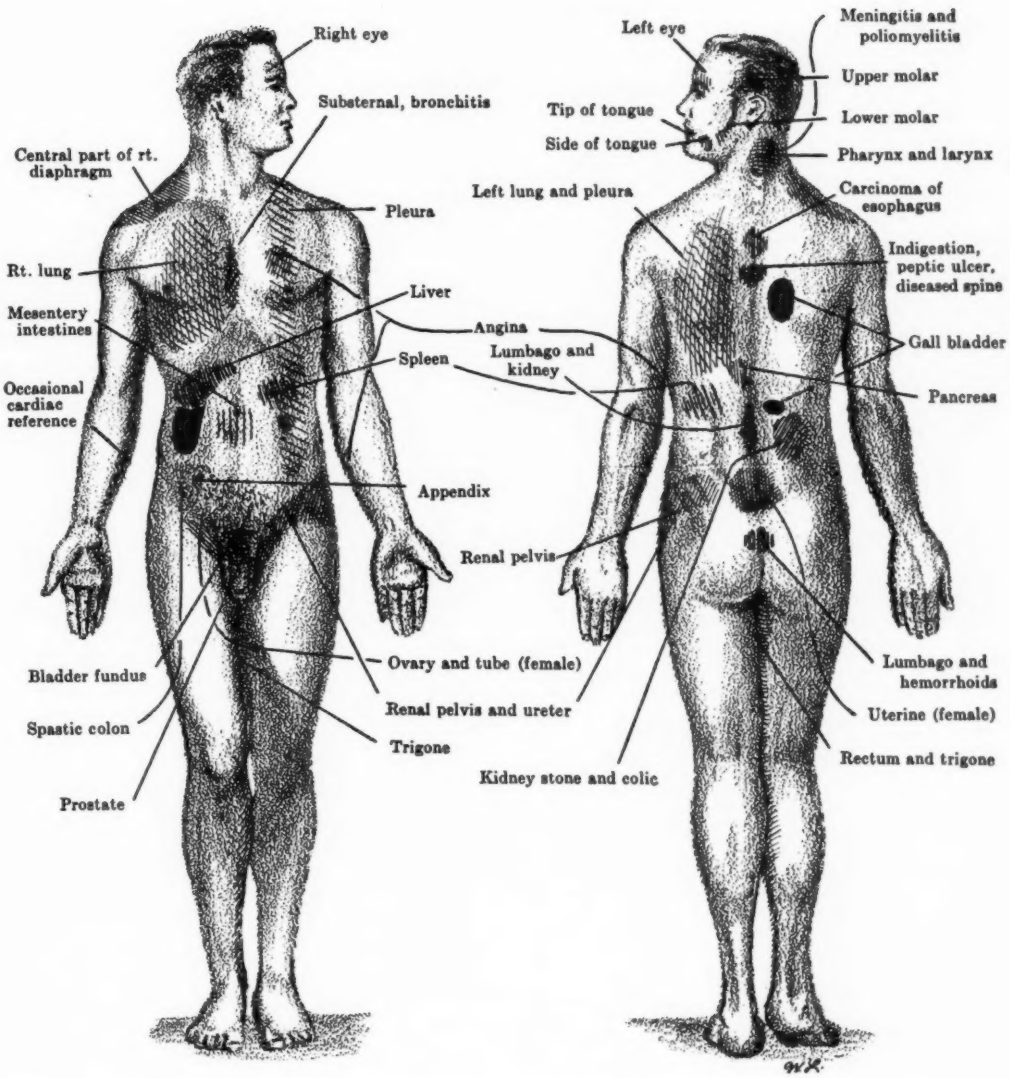
"The reception of a young physician into practice and the maintenance of his reputation is largely judged by his ability to relieve pain," followed by eleven general rules in the use of analgesics, the eleventh being in the nature "The use of narcotics for headache is often a confession or a warning of lassitude and indifference to the patient's condition."

Section III consists of the formal presentation of diseases and their treatment. This section occupies the bulk of the book, some 500 pages. A classical method of case discussion is employed, that is, discussion first of etiology, then diagnosis, medical and surgical therapy and prognosis, with tremendous emphasis on medical therapy.

There are many illustrations of the type of line

*Practical Therapeutics, by Martin Emil Rehfuss, M.D., F.A.C.P., F. Kenneth Albrecht, M.D., and Alison How Price, A.B., M.D. 796 pages, illustrated. Baltimore: The Williams & Wilkins Company, 1948. Price $15.00.

SITES OF VISCERAL REFERRED PAIN



Front view Back view

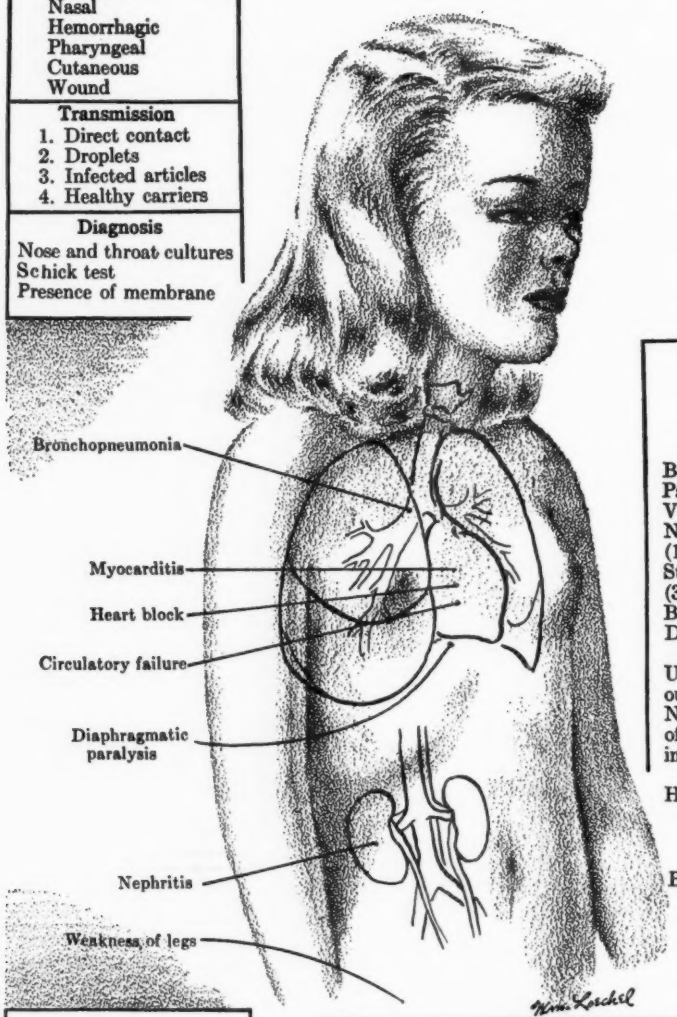
PLATE 9

DIPHTHERIA

Forms
- Tonsillar
- Nasopharyngeal
- Laryngeal
- Nasal
- Hemorrhagic
- Pharyngeal
- Cutaneous
- Wound

Transmission
1. Direct contact
2. Droplets
3. Infected articles
4. Healthy carriers

Diagnosis
- Nose and throat cultures
- Schick test
- Presence of membrane



Symptoms	Complications
	Otitis media
	Peritonsillar abscess
	Myocarditis
Bradycardia, Pallor, Vomiting	Circulatory failure
Nasal voice (10–14th day)	Palatal paralysis
Strabismus (3rd week)	Oculomotor paralysis
Blurred vision, Dilated pupils (3rd week)	Ciliary paralysis
Unable to blow out cheeks	Facial paralysis
Nasal regurgitation of food and difficulty in swallowing (4th week)	Pharyngeal paralysis
Hoarseness–aphonia (3rd–5th week)	Laryngeal paralysis
Breathing difficulty	Diaphragmatic paralysis, Pneumonia, Nephritis
	Multiple neuritis
	Guillian-Barré Syndrome

Differential Diagnosis
- Acute tonsillitis
- Vincent's angina
- Septic sore throat
- Scarlet fever
- Thrush
- Catarrhal laryngitis
- Agranulocytosis
- Foreign body in larynx

Nursing Care
- Concurrent disinfection
- Scrupulous care of mouth, nose and throat
- Rest important: Avoid overzealous nursing in severe cases.
- Nasal feeding may be necessary
- Careful observation
- Have intubation equipment always in readiness

Treatment
1. Antitoxin } combined
2. Penicillin }
3. Aspiration
4. Intubation
5. Tracheotomy
6. Nasal feeding
7. Respirator
8. Aerosol penicillin for carriers

Illustrations from: "Practical Therapeutics."

PNEUMONIA

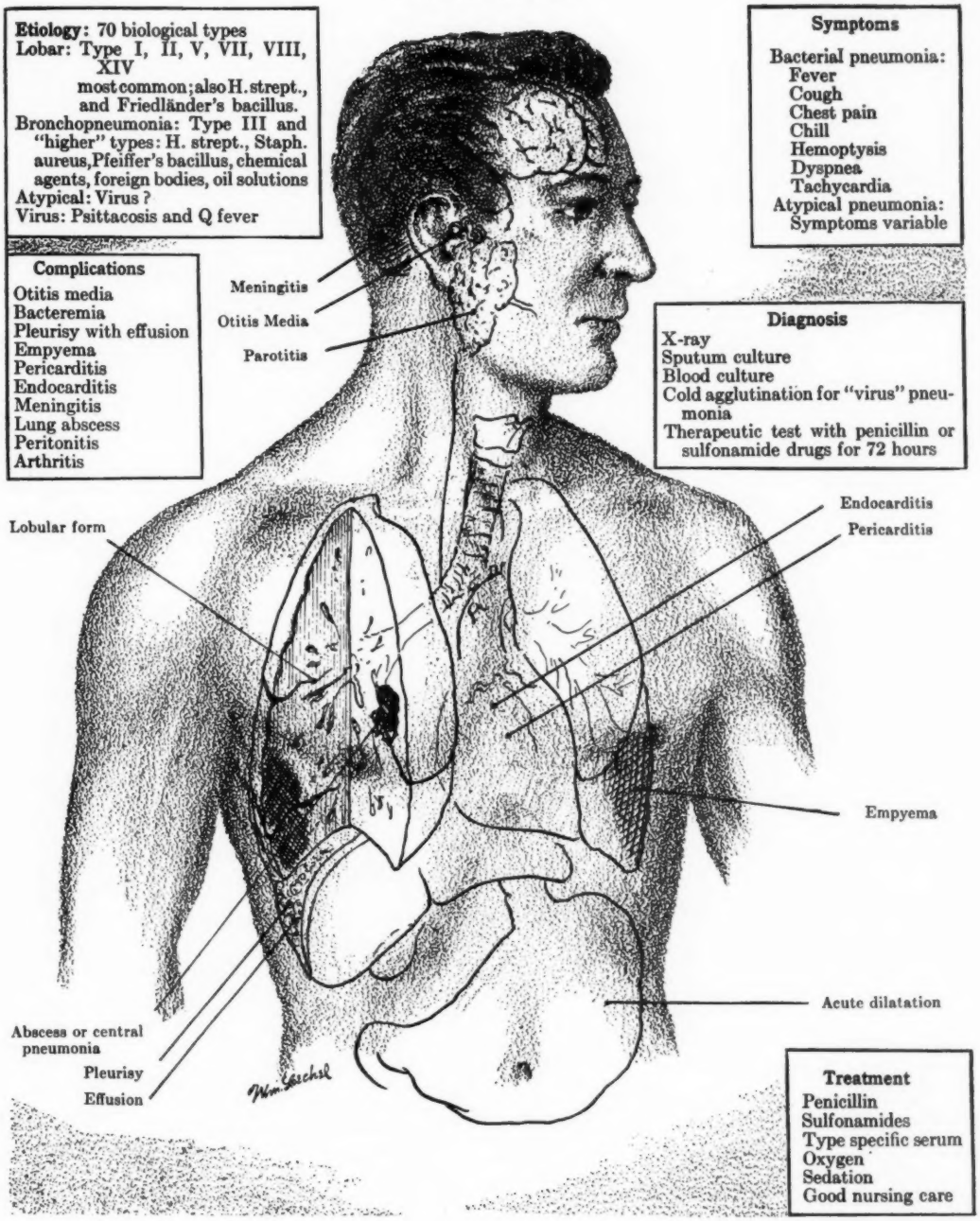
Etiology: 70 biological types
Lobar: Type I, II, V, VII, VIII, XIV
most common; also H. strept., and Friedländer's bacillus.
Bronchopneumonia: Type III and "higher" types: H. strept., Staph. aureus, Pfeiffer's bacillus, chemical agents, foreign bodies, oil solutions
Atypical: Virus ?
Virus: Psittacosis and Q fever

Symptoms

Bacterial pneumonia:
Fever
Cough
Chest pain
Chill
Hemoptysis
Dyspnea
Tachycardia
Atypical pneumonia:
Symptoms variable

Complications

Otitis media
Bacteremia
Pleurisy with effusion
Empyema
Pericarditis
Endocarditis
Meningitis
Lung abscess
Peritonitis
Arthritis



Diagnosis

X-ray
Sputum culture
Blood culture
Cold agglutination for "virus" pneumonia
Therapeutic test with penicillin or sulfonamide drugs for 72 hours

Treatment

Penicillin
Sulfonamides
Type specific serum
Oxygen
Sedation
Good nursing care

SCHEDULE A

Activity	Diet	Medications	Special Orders	Basic Studies
1. Absolute bed rest.	1. *Liquids*—As tolerated.* a. Low fat liquid formula (see attached formula). b. Sweetened, albuminized, gelatinized fruit juices. 2. *Semi-Solid Foods*—As desired. a. Jello, junket. b. Cottage cheese. c. Jam, jelly. d. Apple sauce. e. Mashed baked potato. f. Rice (sugared). 3. Hard candies freely. 4. Weigh diet and food residues on tray after meal. Keep record of actual food consumed in terms of total calories, carbohydrate, protein and fat.	1. Vitamin B complex with ascorbic acid, 5 cc., intravenously or intramuscularly, daily (may be placed in saline or glucose infusion solutions if these are given). **Thiamine hydrochloride, 10 mg. Riboflavin, 10 mg. Pyridoxine hydrochloride, 5 mg. Calcium pantothenate, 50 mg. Nicotinamide, 250 mg. Ascorbic acid, 500 mg. 2. Liver extract (crude) 2 cc., intramuscularly, daily. 3. Choline or Methionine 4-6 gm. daily, by mouth (if tolerated). 4. Vitamin A-D concentrate, 2 caps, daily, by mouth (if tolerated). Per cap. {Vit. A 15,000 I.U. {Vit. D 1,500 I.U. 5. Vitamin K, 10 mg., subcutaneously, daily.	1. Infectious precautions (see attached list of precautions to be taken). 2. Record temperature, pulse and respiratory rates 4 times daily. 3. Weigh daily (bedside scale) and record weight. 4. Chart twenty-four-hour fluid intake and output. 5. Protein hydrolysate or amino-acid solutions, salt-free human albumin, plasma, glucose solution or saline, intravenously in quantities sufficient to maintain adequate caloric and nutrient intake and fluid and electrolyte balance.	1. Complete blood count. 2. Urinalysis, routine, plus examination for bilirubin (semi-quantitative Harrison spot test or Methylene blue test recording number of cc. or drops of Methylene blue required). 3. Serum bilirubin (one minute and total). 4. Repeat serum bilirubin and/or quantitative test for biluria three times weekly. 5. Other liver function tests, preferably: cephalin cholesterol flocculation, thymol turbidity including eighteen-hour ratio or flocculation, colloidal gold, serum alkaline phosphatase, serum cholesterol (total and free), prothrombin and serum protein (total, albumin and globulin). 6. Blood sugar. 7. Erythrocyte sedimentation rate. 8. If vomiting has been marked and there is reason to suspect chemical imbalance, the following additional determinations should be made: (a) blood urea nitrogen, (b) plasma chlorides, (c) plasma CO_2 combining power.

*Liquid nutrient material may occasionally be administered through a nasogastric tube, especially when anorexia is prolonged and so pronounced that the patient cannot be induced to eat or drink.

**This material is available as Solu B. with Ascorbic Acid (Upiohn Co.).

and one color drawing similar to plate 9. These plates represent an interesting adaptation of visual education to medical teaching. The book is weighted with charts and schedules. Schedule A (page 220), illustrated, outlines the management of infectious hepatitis during the stage of acute illness with anorexia, nausea, and vomiting. Aside from the obvious value to the student preparing for the examination question, "What is the treatment for the acute stage of hepatitis?" such an outline is of value to any physician not specializing in liver disease, faced with the problem of management of such a case.

Section IV, Special Treatment, represents essen-

tially the contributions of specialties outside of the department of medicine such as EENT, dermatology, psychiatry, physical medicine, pediatrics and the like. Each of these subjects is considered in other courses in most medical schools and undoubtedly at Jefferson also. This section does not compare with the others in the text, adds little to the value of the book, and probably in subsequent editions will be eliminated with incorporation of such material as oxygen therapy and the use of radioactive isotopes into the discussion of applicable diseases.

There is no doubt that this book will be favorably accepted by both town and gown. It fills a most necessary gap existing between formal texts produced by medical departments and compendia of materia medica out of departments of pharmacology. Finally, this reviewer must point out that there is no better review of therapeutics that has come to his attention for refresher study in preparation for medical examinations.

R. B.

New Books Received

► ZINSSER'S TEXTBOOK OF BACTERIOLOGY - - -

By David T. Smith, M.D., Donald S. Martin, M.D. et al. 9th Edition. 992 pages. 1948, Appleton-Century Crofts, Inc., New York. Price $10.00.

Ever since the first edition of this work was published in 1910, it has been widely used by bacteriologists and students of public health and clinical medicine. The present authors have in general retained the same outline and arrangement of chapters as in the eighth edition, but have revised each chapter, re-written several completely and added others. The basic biologic approach to bacteriology has been maintained. One hundred and eighty-two new illustrations have been added, including many electron micrographs, which illustrate submicroscopic morphological details of bacteria and viruses. The bibliographic references are largely to the 1948, 1947, and 1946 literature.

► CANCER MANUAL: Standards for the Diagnosis and Treatment of Cancer - - -

By The Cancer Committee of the Iowa State Medical Society. 160 pages. 1948, Athens Press, Iowa City, Iowa. Price $1.00.

First published in 1937 for the physicians of Iowa, the "Cancer Manual" has proved so popular that over 50,000 copies have been printed and distributed to doctors of several states. This new edition presents the newest developments in the fields of cancer diagnosis and therapy. The manual starts with General Considerations of cancer and proceeds in succeeding sections to cancer of each site of the body in which it may occur. The discussions cover all the important factors, including etiology, incidence, signs and symptoms, history, diagnosis, differential diagnosis, treatment, and prognosis.

Principal editors of the book are Drs. A. W. Erskine, S. F. Singer, and D. F. Ward.

► CLINICAL ROENTGENOLOGY OF THE DIGESTIVE TRACT - - -

By Maurice Feldman, M.D., Assistant Professor of Gastroenterology, University of Maryland; Associate in Gastroenterology, Mercy Hospital; Consulting Roentgenologist, Mt. Sinai Hospital. 3rd Edition. 901 pages, illustrated. 1948, The Williams & Wilkins Company, Baltimore. Price $8.00.

This book was written to present a clinical roentgenological consideration of the diseases of the gastrointestinal tract. It was written as an aid for the diagnosis of the digestive tract for the roentgenologist, gastroenterologist, student and general practitioner. All phases of the gastrointestinal tract are covered with emphasis on clinical aspects. Much additional information and numerous new illustrations have been added.

► PHYSICIAN'S HANDBOOK - - -

By John Workentin, Ph.D., M.D., and Jack D. Lange, M.S., M.D. 5th Edition. 293 pages. 1948, University Medical Publishers, Palo Alto, California. Price $2.00.

This handbook is designed to summarize comprehensively diagnostic procedures and factual data to which the practicing physician can quickly and easily refer. The authors have also tried to include a relatively complete laboratory manual and the common clinical tests. In this revision further emphasis has been given to clinical factors, such as the significance of abnormal laboratory test findings.

► A.M.A. INTERNS' MANUAL - - -

209 pages. 1948, W. B. Saunders Company, Philadelphia and London. Price $2.25.

In this manual is found information for interns ranging from a discussion of internships and residencies through clinical and laboratory data, drug administration, materia medica, diagnosis and treatment of acute poisoning, diet and nutrition, and physical medicine. In addition, there is a statement from the A.M.A. Bureau of Legal Medicine and Legislation on the legal aspects of internships and a description of the various divisions of the A.M.A. The manual has been planned for use as an adjunct to any hospital rule book or formulary and especially for interns in hospitals which do not supply printed copies of rules, prescriptions, and procedures.

► DETAILED ATLAS OF THE HEAD AND NECK - - -

By Raymond C. Truex, M.S., Ph.D., Associate Professor of Anatomy, and Carl E. Kellner, Artist, Department of Anatomy, College of Physicians and Surgeons, Columbia University. 162 pages. 1948, Oxford University Press, New York. Price $15.00.

For the student and the practitioner who wish to gain a more lasting understanding of the intrinsic anatomy of the head and neck, this handsome volume offers in 147 figures all the pictorial aids needed to reconstruct a three-dimensional view of a given region. The authors have supplemented an extensive series of dissections with three additional sets of figures: (1) full-page drawings of the skull and vertebrae, to show attachments of muscles and ligaments; (2) a series of frontal sections related to bony landmarks; and (3) a series of transverse sections similarly oriented. The skillful dissections have been expertly portrayed by the artist and carefully executed by the publishers.

EDITORIALS

CLIMATOTHERAPY

For many years it has been common practice to recommend a change of climate to patients who suffer from various allergic diseases. Just why a change of climate should influence such diseases as bronchial asthma has never been readily explainable, although it is admitted that many sufferers do get better after the change is made. However, too many patients do not improve after being put to great sacrifice and financial strain to move to Arizona or other parts of the southwestern United States.

Dr. F. B. Schutzbank, an allergist from Tucson, Arizona, recently reported the results of his observations on 150 patients who came to Tucson for some allergic disorder. Of 101 asthmatics, 74 were benefited from 50 per cent to complete relief of symptoms. Of these 74 benefited, Dr. Schutzbank stated that the improvement could be attributed to getting away from psychosomatic influences in 32 cases and to improvement of chronic respiratory tract infection in 26 cases. Those affected by cold, dampness, high humidity, and storminess naturally do better in a climate that is warm, dry and calm.

Dr. Schutzbank stressed the importance of studying the patients more thoroughly at home before recommending climatotherapy. An investigation of environmental factors having a nervous or psychic influence in causing allergy symptoms is just as important as testing for foods or inhalants, etc., that may act as the offending allergen. In any case the "allergic symptoms may be the manifestation of a subconscious rebellion or protest in the life of an allergic individual."

Observations have shown that the "allergic threshold" is lowered during periods of emotional strain and that persons sensitive to certain allergens cannot tolerate the causative agents at such times. These individuals, according to Dr. Schutzbank, "have an underlying inherited allergic constitution which manifests itself during periods of nervous and mental strain or fatigue. Many individuals are potentially "allergic" and, as demonstrated during World War II, develop symptoms only when under strain." In the study of any case it must therefore be kept in mind that psychogenic factors are important precipitating causes of allergic symptoms.

In searching for a cause, it is just as important therefore to search for family difficulties, financial problems, or other emotional stresses as well as to test for sensitivity to foods or dust and other allergens.

Another point brought out by Dr. Schutzbank was that in the warm, dry climate of Tucson there is much dust and pollen during most of the year and these may aggravate the symptoms of many patients. The dryness is also conducive to thickening of the secretions so that "bronchial plugging" is more frequently encountered. During the winter months there is as much as 50 degrees or more Fahrenheit difference between the day and night temperatures and some people cannot adjust to such quick variations of temperature.

So the physician, as well as the patient, should not be too hasty in recommending climatotherapy as a cure-all for allergic diseases. After a change of climate is decided on the patient should be instructed to continue the usual treatments indicated in his case and not to depend on the climate alone to effect a miraculous cure of a long standing condition.

A. E.

NERVOUS SYSTEM IN DIABETES

ALTHOUGH tremendous advances have been effected in the treatment of diabetes mellitus, there are many complications of the disease whose etiology and treatment have proved difficult to explain and handle. It has now been urged by Dr. Russell N. DeJong of Ann Arbor that detailed studies be made of the nervous system and its blood vessels in the case of persons suffering from diabetes, and especially in younger patients. Dr. DeJong believes that such studies will show that many of the developments which have resisted explanation result from damage to the vessels and nervous system.

It is Dr. DeJong's theory that "demonstrable changes in the nervous system in diabetes mellitus are in almost every instance caused either by complications of the disease rather than the diabetes itself, or by changes in bodily structure and function which occur as a part of the disease process."

Complications of the disease most commonly encountered include involvement of the nerves, spinal cord, brain, and autonomic nervous system, as well as pathologic changes associated with hypoglycemia. A frequent accompaniment to diabetes mellitus, even in young patients, is arteriosclerosis. Atherosclerosis and arteriolar sclerosis may affect the cerebral vessels before involvement of peripheral and coronary arteries is clinically evident. Almost every case of diabetes is accompanied by arterial changes; treatment followed at present has not averted the accelerated vascular damage which is apparently associated with the disease and not a true complication.

As yet there is no accord among investigators regarding the exact mechanism underlying the pathologic changes occurring in diabetes mellitus and manifested by the nervous system. Not only is there still much to be learned about the etiology and pathology of the neurologic lesions in diabetes, but also about the possible central origin of the disease. C. S.

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Consultation Service

This special consultation information service is offered as a regular monthly feature of *Postgraduate Medicine*. Readers are invited to call on this Service for answers to difficult medical problems from members of our Editorial Board best qualified to help. Each question will be answered by mail and those of general interest will be published each month. Address all communications to Consultation Service, *Postgraduate Medicine*, 516 Essex Building, Minneapolis 3, Minnesota.

TREATMENT OF PNEUMONIA

QUESTION: What are the indications in pneumonia in adults to decide whether to use sulfa drugs, penicillin, or both, in treatment?

M.D.—Michigan

ANSWER: Penicillin is the drug of choice in treating lobar or bronchopneumonia for the reasons that it is more effective, it is easier to administer, it has fewer side effects, and its effects are more quickly observed. It has no value in treating viral pneumonia, except that it diminishes secondary invaders. Adequate dosages of penicillin to maintain a high blood level of this drug can be done with some of the newer preparations. The injections can be given in larger doses and at longer intervals. The drug can also be given, but not as effectively, by mouth.

Sulfa drugs in adequate doses are also beneficial, but are not quite as effective as penicillin, and produce more unpleasant side reactions. In those patients seen late in the disease and desperately ill, both drugs may be used at the same time. However, this is rarely found to be necessary.

JAMES E. PAULLIN

PLANTAR WARTS

QUESTION: What is the best treatment for plantar warts? For senile warts?

M.D.—Illinois

ANSWER: The treatment of choice for plantar warts is x-ray irradiation. If the verruca is very thick, it should be treated with 60 per cent salicylic acid in petrolatum until most of the keratotic mass has been removed. A hole the size of the wart is cut in adhesive tape. The tape is then applied to the foot, the wart protruding through the hole. A thin layer of ointment is then spread over the verruca and this in turn is covered with another layer of adhesive tape. This keeps the ointment in contact with the lesion and prevents its keratolytic action on the surrounding normal skin. This procedure is repeated each night, the softened epidermis on the surface of the wart being removed before a new application of the salve. When most of the keratotic mass has been removed in this way, the surrounding tissue is carefully protected with lead foil and the base of the verruca irradiated with 600 to 800 r unfiltered x-ray, depending on the size of the lesion. Irradiation may have to be repeated two or three times at weekly intervals before a cure is effected.

Since senile warts or seborrheic keratoses are delayed epithelial nevi and therefore essentially benign, the method of removal which leaves the best cosmetic result is the treatment of choice. These keratotic growths are superficially located, as if "stuck on" the skin. One rapid method of removal is to freeze the lesion with ethyl chloride spray and then scrape off the growth with a sharp curette. Little bleeding ensues. Coagulation can be hastened by painting the surface with Monsel's solution. An equally rapid method is to lightly sear the surface of the verruca with the actual cautery. The warty growth can then be wiped off with gauze, leaving an undamaged dermis. If properly done, healing without scar results. An equally successful method is to touch the individual lesions for a few seconds with carbon dioxide snow under light pressure.

BEDFORD SHELMIRE

BRONCHIAL ASTHMA

QUESTION: In the treatment of bronchial asthma, which of the following give prompt relief; adrenalin injection, aminophylline intravenously, aleudrine inhalation, glucose intravenously?

M.D.—Ohio

ANSWER: Injections of adrenalin will give very prompt relief in the treatment of asthma. Aminophylline also will give relief. If the patient is a so-called "adrenalin-fast" individual, aminophylline intravenously is indicated and the relief is very dramatic.

Inhalation of any substance, aleudrine included, is apt to be slower and, in the severe asthmatic, of very little value.

Intravenous glucose is excellent from the standpoint of dehydration and as a supportive for the patient.

HARRY L. ROGERS

SERUM FOR MEASLES

QUESTION: What are the relative merits of human serum gamma-globulin and convalescent measles serum in the prevention of or attenuation of measles?

M.D.—North Dakota

ANSWER: In proper doses convalescent measles serum and human serum gamma-globulin are equally effective in preventing or modifying measles. The antibody concentration of gamma-globulin, however, is much greater per cc.; for this reason the dosage of gamma-globulin required is much less in volume;

namely, 2 to 7 cc., depending on the age of the child, as contrasted with 20 cc. of convalescent measles serum for complete prevention. Gamma-globulin is thicker than convalescent serum and requires a 22-gauge needle for easy filling and injection. It is liable to "freeze" quickly in the syringe, causing the piston to stick, so that it must be injected promptly.

FRANCIS G. BLAKE

MENIERE'S SYNDROME

QUESTION: Has tetra-ethyl-ammonium been used in the treatment of Ménière's syndrome and with what results?

M.D.—Iowa

ANSWER: Tetra-ethyl-ammonium is not being used routinely in the treatment of Ménière's syndrome. In fact, I have yet to learn of a case in which it has been used. However, the neurologists feel that since it blocks sympathetic nerve impulses and is a vasodilator, it might be of some help. Of course, since it drops blood pressure markedly, patients should be lying down when it is given.

WILLIAM D. STROUD

PRE-ECLAMPSIA DIET

QUESTION: What is the best diet to prescribe in pre-eclampsia?

M.D.—Michigan

ANSWER: (a) Elimination of table salt and salty foods from diet (as well as sodium bicarbonate) to avoid or overcome sodium retention.

(b) Moderation in fluid intake, especially if edema is present. Three pints of all fluids daily are ample, if patient is edematous.

(c) Generous proportion of carbohydrate intake in diet (including intravenous injections of hypertonic dextrose if patient is acutely ill, especially if showing edema). Carbohydrate intake supplies glycogen for liver storage and protection. Four hundred grams of carbohydrate may be proper to balance with about 75 gm. of protein.

(d) Meat, eggs, milk, and cheese need not be sharply restricted as formerly believed necessary for nephritics and therefore for pre-eclamptics. As stated above, 75 gm. may be allowed daily. Protein hydrolysates, or concentrate, now available commercially, may be utilized as desired, properly to balance the diet if serum proteins are lowered.

(e) Fat is especially necessary, so need not be emphasized nor too rigidly restricted. Fifteen to 20 gm. daily should be an ample allowance.

(f) Fruits, light vegetables, and salads are advisable.

(g) The total of the above constitutes about a 2,000-calorie diet.

PAUL TITUS

STONE FORMATION IN KIDNEYS

QUESTION: How can recurrence of stone formation in the kidney be prevented after conservative operation?

M.D.—Minnesota

ANSWER: Stone re-formation in the kidney after conservative surgical operation cannot always be prevented.

The factors that we feel are usually operative in the formation of renal stone are infection and interference with drainage from the kidney. Changes in chemistry or physiology within the kidney may precipitate salts that form around a nidus of infection and are frequently the beginning of stone formation.

I try to keep drainage tubes out of the kidney following the surgical removal of stone. No matter what kind of tubes are used, with the possible exception of a new plastic, these will cause the precipitation of salts about them which is the beginning of additional stones.

Every effort should be made to disinfect the urine thoroughly. This can be done with antibiotics, with the sulfa drugs, and other chemotherapeutic agents that will control the type of bacterial infection present.

The patient from whom stones are removed should be examined postoperatively to be sure that the drainage from the kidney is adequate and that no lag occurs. In certain instances I have found it helpful to lavage the kidney pelvis with not too irritating disinfecting solutions, as silver nitrate, using large ureteral catheters.

Another method which is frequently helpful in the control of the re-formation of stone in the kidney is diet change. A diet should be prescribed only after the surgeon has chemically analyzed the stone which has been removed. When he knows the chemical contents, he can eliminate these materials from the diet. By diet he can produce a *p*H of the urine either on the alkaline or acid side, so that stones of this chemical character will not form.

Another helpful suggestion is that the patient should drink large quantities of water, preferably water that is free from soluble minerals or salts. Sometimes the patient drinks distilled water or a good spring water.

When the drainage from the kidney is good and infection is under control, some surgeons do nothing more than to insist that the patient drink quantities of good water for several months following the surgical removal of the stone. It is well to see that the patient exercises in an upright position frequently. We know that stones form more often in individuals who are in a recumbant position by injury or illness.

Before the stone is removed, the surgeon should make the usual examinations for hyperparathyroidism, particularly if the case under discussion is one in which recurrent or multiple stones are formed. This condition of hyperparathyroidism is being overlooked more often than we realize.

GILBERT J. THOMAS

INFORMATION TO FAMILY OF PSYCHOTIC

QUESTION: Please advise me what information I am required to give the husband of a patient of mine who is confined to Virginia State Hospital for Insane. She is probably permanently insane.

I would like also to know what information is optional with me as to its divulgence. I have a history record of hers dated back two or three years prior to her marriage and also some during her married life, but none in regards to this mental illness.

M.D.—Virginia

ANSWER: I would advise the doctor to depend on the information given by the State Hospital superintendent regarding the present status and condition of the patient.

The doctor is not required to give any information regarding the prepsychotic personality of the patient which is a privileged communication to him. He should, however, give any pertinent facts to the state hospital physician which may be of value in helping the patient.

BRUCELLOSIS

QUESTION: This question concerns the treatment of brucellosis. The patient in question developed an acute case two months ago. Since it was not too severe and the patient not financially able, she was not hospitalized, but was treated with brucellosis vaccine twice weekly in increasing dosage up to a maintenance level of 1.0 cc. At first there was clinical improvement; now, however, she is regressing and the agglutination titer is still 44 in a dilution of 1/320.

This patient is a registered nurse and has a nurse friend on whom a combination of sulfa drugs and streptomycin was used plus frequent intravenous injections of "radioactive manganese and some other drugs or chemicals," as she stated, was used. This treatment apparently was successful but is completely unknown to me. Can you enlighten me as to whether it is an accepted treatment and if so, the details of administration?

M.D.—Kansas

ANSWER: Evidence is lacking to support the contention that brucellosis vaccines are effective in the treatment of brucellosis. Most investigators have abandoned its use as a therapeutic agent. In cases of acute brucellosis or chronic brucellosis with positive blood cultures (bacteremia) the present accepted method of treatment consists of a ten to fourteen-day course of sulfadiazine combined with streptomycin (PULASKI, E. J., and AMSPACHER, W. H.: Streptomycin therapy in brucellosis. Bull. U.S. Army M. Dept. 7:221-225 [February] 1947).

Enough sulfadiazine is administered to maintain blood levels around 10 to 14 mg. per cent. At the same time the patient receives streptomycin by the intramuscular route. The average total daily dose of streptomycin is 2.4 gm. On occasion it may be necessary to give a second course but only if the blood cultures remain positive. It is not necessary to use radioactive substances or other chemicals along with the sulfadiazine-streptomycin therapy.

PERSISTENT PAIN IN HAND

QUESTION: A dentist, age 53 years, consulted me because of pain and tenderness limited to the ulnar side of the right hand, mostly limited to the little finger in its metacarpal portion especially near the head of the bone, the metacarpal-phalangeal joint. He stated that local swelling and tenderness were markedly aggravated by his professional work, as well as active and passive motion. He is right-handed. The discomfort was constant, but was slightly benefited by local rest. There was no local redness or heat. He stated that he had suffered a "crushing" type of injury some six to eight years previously when, while shaking hands his hand was severely crushed. It remained sore and tender for several weeks but he had sought no medical advice at that time.

The present ailment was dated by him to have occurred on May 31, 1948, when, while chasing a pig on his farm, he fell on the outer side of his outstretched hand. Examination on June 5, 1948, revealed slight local swelling and marked sensation of pain and tenderness in portion described on palpation and passive motion. Pulse, temperature, respiration, and blood pressure were within normal range. Weight was 160 pounds. X-ray films, taken AP and lateral views revealed no bony abnormalities or dislocation and no arthritic changes were noted. STS, agglutination, heterophile antibody tests were reported as negative. Hb 13.7 gm.; RBC 4.8; WBC 8500 with 72 per cent polys and 28 per cent lymphs; morphology appeared normal; ESR: 8 mm. in one hour (Landau-Adams-normal 0.6 mm./one hour).

His past health had been good. He had undergone an uncomplicated appendectomy in 1944. Rest to the affected parts was advised for two to four weeks, local heat, and oral analgesic-ASA-were also suggested. It was impossible for him to stop his professional work completely, however. The disability has persisted essentially unchanged, except for temporary relief with salicylates.

A discussion of the probable diagnosis, further treatment, and relationships of repeated trauma incurred by his professional work of extraction of teeth, which seems most bothersome, would be appreciated.

M.D.—Indiana

ANSWER: Without the opportunity to examine the patient, it would be rather impossible definitely to make the diagnosis. If there was a delay of several hours in the development of pain and swelling in this joint after the fall on the hand, then early gout might be suspected, and it would be well to see if the values for serum urates are elevated, particularly if the swelling localized definitely to the area of the joint. If, however, the swelling was proximal to the joint, tenosynovitis might be suspected, although it would be an unusual location for this condition.

This case is interesting. If the diagnosis of gout is established, treatment of gout can be started. If the condition is felt to be tenosynovitis, then a roentgen therapist might be consulted. It is difficult to say, without a definite diagnosis, that the use of the hand in extracting teeth has any causal relationship to the symptoms of this patient.

Association Notes

EVARTS A. GRAHAM TAKES OFFICE AS PRESIDENT

WALTMAN WALTERS CHOSEN I.P.M.A. PRESIDENT-ELECT

EVARTS A. GRAHAM

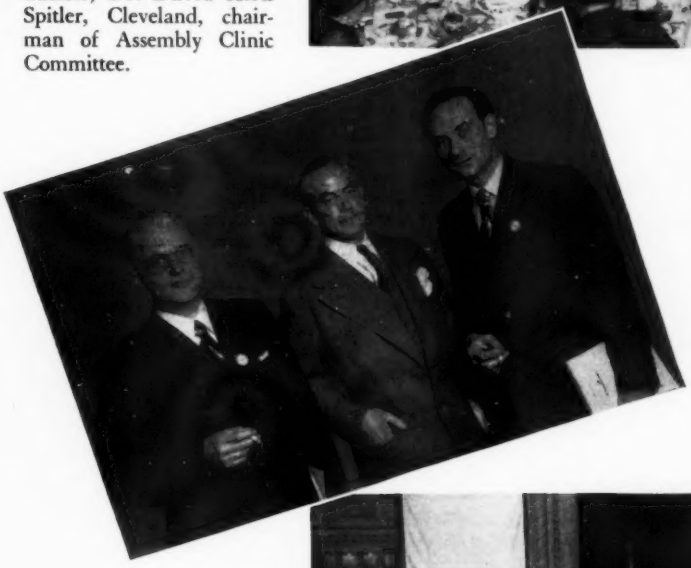
WALTMAN WALTERS

Named as president-elect of the Interstate Postgraduate Medical Association, Dr. Walters will take office at next year's Assembly in Philadelphia scheduled for October 31 to November 3, 1949. Dr. Walters, who was elected at the Association's Annual Assembly in Cleveland, Ohio, November 9 to 12, 1948, is professor of surgery, Mayo Foundation, University of Minnesota Graduate School of Medicine, Rochester, Minnesota. He will succeed Dr. Evarts A. Graham, head of the department of surgery of Washington University School of Medicine, St. Louis, Missouri.

Officers re-elected include Dr. Arthur G. Sullivan, Madison, Wisconsin, managing director; Dr. Tom B. Throckmorton, Des Moines, Iowa, secretary; Dr. Henry G. Langworthy, Dubuque, Iowa, treasurer and director of the Foundation Fund; Dr. Mather Pfeiffenberger, Alton, Illinois, speaker of the Assembly, and Dr. John F. Erdmann, New York, and Dr. Frank H. Lahey, Boston, presidents of clinics.

Members of the nominating committee appointed by Dr. Herman L. Kretschmer, 1948 president of the Association, were: Dr. Cyrus C. Sturgis, Ann Arbor, Michigan, chairman; Dr. Stephen W. Williams, Chippewa Falls, Wisconsin; Dr. C. Glenn Curtis, Brea, California; Dr. Carl Henry Davis, Wilmington, Delaware, and Dr. Irvine McQuarrie, Minneapolis, Minnesota.

At the speakers' table for the Assembly dinner November 11, 1948, are (left to right): Dr. David A. Chambers, chairman of the Cleveland Committee for the 1948 Assembly; Dr. Evarts A. Graham, St. Louis, president of the Association; Dr. Herman L. Kretschmer, retiring president of the Association; Sir Archibald McIndoe, London, England; Countess Maria Pulaski; Dr. Donald C. Balfour, recently retired Director of the Mayo Foundation; Dr. David Kirk Spitler, Cleveland, chairman of Assembly Clinic Committee.

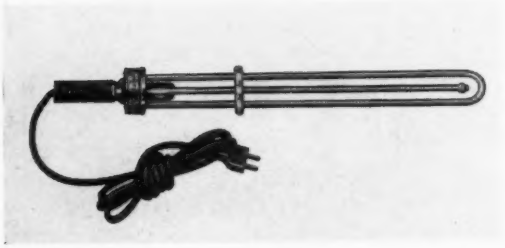


Dr. Charles W. Mayo (center), editor-in-chief of *Postgraduate Medicine,* is pictured here with Dr. Walter Risinger (left) of Boras, Sweden, chief surgeon of the Solhem Hospital, and Dr. Heinrich Leuchter (right), Frankfort, Germany.

View of the audience in the Cleveland auditorium during a clinical presentation.

New Drugs and Instruments

Information published in this department has been supplied by the manufacturers of the products described.



ELECTRIC IMMERSION HEATER

DESCRIPTION: This is an automatic immersion heater with adjustable thermostat control, which heats liquids within tanks, kettles, tumblers, etc., where liquids absorb all the heat generated.

The instrument has an adjustable thermostat control to maintain temperatures to within 1° F. tolerance. A safety cut-out is included to prevent the element's overheating or burning out when out of solution.

Three immersion lengths, 8″, 15″, and 20″, are available in acid-resisting stainless alloy, designed particularly for x-ray tanks, as well as a 5″ size for quick sterilization and general utility. Other sizes are available on special order. The heaters operate on 110 volts A.C., 9.5 Amps.

The heaters are being marketed under the name of "CHILL-CHASER."

PRODUCER: The Still-Man Company, New York 56, N.Y.

PARDESS

PURPOSE: A new vitamin product.

COMPOSITION: Each "Vacule" vial of Pardess contains thiamine hydrochloride (vitamin B_1), 25 mg., riboflavin (vitamin B_2), 10 mg., pyridoxine hydrochloride (vitamin B_6), 5 mg., calcium pantothenate, 50 mg., niacinamide, 250 mg.

DESCRIPTION: Feature of this new preparation is the preservation and prolongation of vitamin activity by the lyophile technic (desiccation under vacuum from the frozen state).

INDICATIONS FOR USE: Indicated in any and all conditions where injectable B-complex might be desired whether it be in deficiency states, surgery, febrile illnesses, or convalescence.

DOSAGE AND ADMINISTRATION: Daily dosage, intramuscularly, is the contents of one "Vacule" vial restored to 1 cc. Daily dosage, intravenously, is the contents of one "Vacule" vial restored to 5 cc.

HOW SUPPLIED: Packages of five 5-cc. Vacule vials of lyophilized material and five 5-cc. vials of water for injection. Also supplied in packages of twenty-five 5-cc. Vacule vials of lyophilized material (without diluent).

PRODUCER: Sharp & Dohme, Inc., Philadelphia 1, Pa.

MENAGEN

PURPOSE: Oral estrogen therapy.

COMPOSITION: Contains crystalline, equine estrogenic factors, available in soft, gelatin capsules for oral use. Each capsule of Menagen contains the estrogenic equivalent of 10,000 I. U. of ketohydroxyestratriene.

INDICATIONS FOR USE: In the treatment of menopausal symptoms and in any other condition involving estrogenic deficiency. Sometimes used in conjunction with parenteral estrogens.

HOW SUPPLIED: Menagen Capsules, 10,000 International Units each, in bottles of 100 and 1,000.

PRODUCER: Parke, Davis & Company, Detroit 32, Mich.

d-TUBOCURARINE CHLORIDE IN PEANUT OIL WITH MYRICIN

PURPOSE: Muscle relaxant, anticonvulsant, antispasmodic.

COMPOSITION: Crystalline, quaternary curare alkaloid, stable, not affected by sterilization, in suspension of peanut oil with myricin. Each cc. contains 27 mg. of *d*-tubocurarine chloride pentahydrate (which is equivalent to 180 units as Intocostrin*), and 48 mg. of myricin.

DESCRIPTION: Paralyzes or partially blocks neuromuscular conduction at the myoneural junction; uniform and slow absorption affords prolonged relaxation.

INDICATIONS FOR USE: Muscle spasm, as in direct trauma to muscle, low back syndrome, orthopedic deformities with reflex spasms, myositis, and arthritis; spasticity, as in degenerative diseases of the central nervous system, spinal cord injury, cerebrovascular disease, and tumors of the brain and spinal cord; spasticity with dystonic features; dystonia and athetosis; rigidity, as in Parkinson's syndrome.

CAUTIONS: This is a dangerous drug if improperly used. Detailed information about cautions to be observed in the use of the preparation is contained in the package enclosure.

DOSAGE AND ADMINISTRATION: Intramuscularly. Administer the total daily dosage in a single injection, using only one site. Site of injection should be changed with each injection. An interval of at least twenty-four hours should elapse between injections. Adults: 1 cc. ± 0.25 cc. Muscle spasm, somewhat higher and dystonia somewhat less; in cerebral palsy and rigidity about 0.75 cc.; 0.1 cc. in patients with amyotrophic lateral sclerosis. Dosage determined by clinical observation, the most effective dose without loss of voluntary motor power being chosen. Children: 0.25 cc. with subsequent adjustment of dose as necessary.

HOW SUPPLIED: 5-cc. vials.

PRODUCER: E. R. Squibb & Sons, New York, N.Y.

*"Intocostrin" (Reg. U.S. Pat. Off.) is a trade mark of E. R. Squibb & Sons.

FOLBESYN

PURPOSE: Treatment of nutritional disorders.

COMPOSITION: Each tablet contains: 10 times the minimum daily adult requirement of thiamine; 2½ times the estimated minimum daily adult requirement of niacinamide; 2½ times the minimum daily adult requirement of riboflavin; 5⅘ times the minimum daily adult requirement of ascorbic acid. The tablets also contain Folvite* Folic Acid *Lederle,* vitamin B complex factor developed for therapeutic treatment of megaloblastic anemias.

DESCRIPTION: Folbesyn* Vitamin Tablets were formerly known as Synbefax Vitamins.

INDICATIONS FOR USE: For treating gastrointestinal disorders arising from lack of vitamins, in aiding convalescence from infections, and in creating high nutritional levels in patients before and after surgical operations. The tablets may also be used in mild cases of malnutrition which do not require specific therapy.

PRODUCER: Lederle Laboratories Division, American Cyanamid Company, Pearl River, N.Y.

*Reg. U.S. Pat. Off.

HISTADYL

PURPOSE: Antihistaminic compound for treatment of allergic symptoms.

COMPOSITION: N,N-dimethyl-N' (2-thenyl)-N'-(2-pyridyl)-ethylenediamine. "Histadyl" is Eli Lilly and Company's trade mark for the hydrochloride of thenylpyramine.

INDICATIONS FOR USE: Most important indications for the administration of "Histadyl" are as follows: (1) nasal symptoms and lacrimation associated with hay fever; (2) acute urticaria or angioneurotic edema due to food and drug allergy and serum sickness; (3) vasomotor rhinitis; (4) atopic dermatitis and eczema; (5) chronic urticaria, and (6) allergic cough.

DOSAGE AND ADMINISTRATION: Patients differ widely in the dose required. Effective doses for an adult have varied from 12 to 100 mg., the usual dose being 50 mg. four to five times daily. If the dose is taken after meals, there is less likelihood of by-effects.

HOW SUPPLIED: Pulvules "Histadyl" (Thenylpyramine Hydrochloride, Lilly) are supplied in bottles of 100 and 1,000 as follows: Pulvules "Histadyl," 25 mg. (No. 295); Pulvules "Histadyl," 50 mg. (No. 296), and Pulvules "Histadyl," 100 mg. (No. 297).

PRODUCER: Eli Lilly and Company, Indianapolis, Ind.

BARBONATE TABLETS

PURPOSE: Antacid; antispasmodic; sedative.

COMPOSITION: Aluminum dihydroxy aminoacetate (Alminate Bristol) ..... 0.5 gm. (7½ gr.)
Phenobarbital, U.S.P. ..... 8.0 mg. (⅛ gr.)
Belladonna alkaloids ..... 0.16 mg. (1/400 gr.)
Oil peppermint ..... q.s.

INDICATIONS FOR USE: In the symptomatic management of the complete clinical picture of gastrointestinal irritability, hyperacidity, and spasm. In the relief of symptoms due to cardiospasm, gastric hypermotility, and pylorospasm, whether due to functional hyperacidity, gastritis, or peptic ulcer.

CAUTION: May be habit forming.

DOSAGE AND ADMINISTRATION: One or more tablets, as required for relief, to a total of 12 in twenty-four hours. Larger doses in the management of more severe cases may be used at the discretion of the physician. The tablets may or may not be chewed—taken with or without water—as the patient elects.

HOW SUPPLIED: Bottles of 100 and 500 tablets.

PRODUCER: Bristol Laboratories, Inc., Syracuse, N.Y.

PORTO-LIFT

PURPOSE: Hydraulically operated Invalid Lifter.

DESCRIPTION: Porto-Lift is so constructed that the patient may be transferred from a wheel chair to an automobile or to a bed. It may be adjusted to the size of any patient and is tested to lift five hundred pounds. The extension legs fold inward for moving through narrow doors. A double arm construction (optional, accessory equipment) may be used in the manner of mobile crutches to help the patient regain the use of his legs.

PRODUCER: Porto-Lift Manufacturing Company, Lansing, Mich.

AQUASOL A AND D

PURPOSE: Natural vitamins A and D in aqueous solution.

COMPOSITION: Four drops (from accompanying dropper) provides in aqueous solution:
Vitamin A ..... 4,000 U.S.P. units
Vitamin D ..... 800 U.S.P. units
From natural fish liver sources.

INDICATIONS FOR USE: For the prevention and treatment of vitamin A and D deficiencies in infants, children, and adults.

DOSAGE AND ADMINISTRATION: As a dietary supplement four drops or more daily, directly on the tongue, or mixed in formula, milk, water, juices, cereals, fruits, puddings, etc.

HOW SUPPLIED: 15 cc. bottles, with marked dropper.

PRODUCER: U.S. Vitamin Corporation, New York 17, N.Y.

SHELLIE NURSER

PURPOSE: Sterile, disposable, collapsible nursing bottles.

COMPOSITION: The Shellie Disposa-Bottle is made of polyethylene, a plastic material. The outer locking rings and the Shell-Caps are made in pink, white, or blue melamine, and can be boiled or sterilized.

DESCRIPTION: Shellies come already sterile in a long roll—each bottle sealed off from the next in line. The bottles are snipped from the roll with scissors, filled with formula, fitted with sterile nipples, and placed in the refrigerator. Before nursing, the air is squeezed out of the bottle, and it can be heated by holding it under a hot water tap. The bottle collapses as the infant nurses.

HOW SUPPLIED: The Shellie Nurser is sold in a Shellie Nurser Kit containing:

Two 3-bottle racks for assembling and storing
Six "natural-action" nipples
Six aluminum inner rings
Six plastic outer locking rings
Six plastic Shell-Caps
One bottle expander
100 Shellie Disposa-Bottles

The Shellie Disposa-Bottles are supplied in rolls of 65 and 100 bottles.

PRODUCER: Shellmar Products Corp., Mount Vernon, O.

TRIDIONE

PURPOSE: For control of the *petit mal* triad and other convulsive disorders.

COMPOSITION: 3,5,5-trimethyloxazolidine-2,4-dione.

DESCRIPTION: A new synthetic drug which has an inhibiting effect on *petit mal,* myoclonic, and akinetic seizures in epilepsy. Exhibits analgesic and general anticonvulsant properties, but has not been investigated sufficiently to permit recommendations for general use.

INDICATIONS FOR USE: In treatment of *petit mal,* myoclonic and akinetic epilepsy in cases diagnosed by the typical "spike and wave" electroencephalogram or by clinical features alone. Most effective in idiopathic epilepsy. In cases in which minor attacks are complicated by the presence of *grand mal* seizures, the latter may not be controlled by Tridione alone.

CAUTIONS: Tridione is contraindicated in patients with severe renal or hepatic injury, and should be used only with caution in those patients who have moderate damage of these organs. Until more is known about its effect on the visual system, it is inadvisable to use Tridione in conjunction with drugs which may injure the optic nerve, or conditions in which optic nerve disease is present.

DOSAGE AND ADMINISTRATION: Must be determined by the response of the patient. For older children and adults the dose required for control of *petit mal* seizures may vary from 1 to 2 gm. per day, preferably given in divided doses. For children, 0.3 gm. per day is suggested as the initial dose under 2 years of age, 0.6 gm. per day for children between ages 2 and 4, and 0.9 gm. per day for older children. Dosage may need to be reduced in the event that drowsiness or other side effects develop.

HOW SUPPLIED: In 0.3 gm. capsules in bottles of 100 and 1,000. Also Tridione Solution, 0.15 gm. per fluidrachm, supplied in pint and gallon bottles.

PRODUCER: Abbott Laboratories, North Chicago, Ill.

CHLORGUANIDE HYDROCHLORIDE

PURPOSE: Antimalarial therapy.

COMPOSITION: N_1p-Chlorphenyl-N_5-isopropylbiguanide hydrochloride.

DESCRIPTION: Chlorguanide is absorbed slowly from the intestinal tract and rapidly eliminated from the tissues which are essentially free from chlorguanide within forty-eight hours after the last dose is administered.

INDICATIONS FOR USE: For prophylaxis, suppressive therapy, treatment of acute attacks, and in producing the radical cure in malaria caused by Plasmodium falciparum. In malaria caused by Plasmodium vivax, the response is slower, about equal to that of atabrine.

DOSAGE AND ADMINISTRATION: For suppressive and prophylactic therapy, a dose of 115 mg. (equivalent to 100 mg. of chlorguanide) two times weekly or 345 mg. once a week is recommended. For an acute attack, 115 mg. three times daily for ten to twenty-one days is recommended.

HOW SUPPLIED: Bottles of 100 and 500.

PRODUCER: The Upjohn Company, Kalamazoo, Mich.

BENYLATE OINTMENT

COMPOSITION: A vanishing cream-type base combined with the scabicidal action of benzyl benzoate.

INDICATIONS FOR USE: Intended particularly for areas in which secondary infection has occurred or where irritation and scratching have broken the skin. Also useful in stubborn cases of re-infestation where a change to another form of effective treatment is often desirable.

HOW SUPPLIED: In jars of 1 ounce and 1 pound.

PRODUCER: George A. Breon & Company, Kansas City, Mo.

Leaves from a Doctor's Diary

By Maurice Chideckel

December 1 . . . As I gaze through the lens of events, the events and the contacts that give one an extensive view of the soul and the spirit of man, I begin to wonder if there is not a center of torture, an area of sadism in one of the four major parts of the brain, in one of the lobes, or in one of the glands, say the pineal or pituitary, just as there is a center of vision, of pain, of laughter, of sex and of anger. Does that area of evil create nefarious purposes, drive man to actions and to utterances unshaped by thought? Does that area generate urges that impel one to harm? Does it create emotions that form compelling forces to glory in the suffering of others?

Fathom the reason why Edward Hitchcock placed banana peels on the stairway of the apartment in which he lives, causing one woman to fall and break the left acetabulum, a middleaged man to sustain a Colles' fracture and a young girl to shatter her fourth lumbar. Just for fun?

Here is Joe Hulick, a man weighed down by a feeling of insecurity, with a past to conceal, suffering from asthmatic bronchitis and struggling to survive, yet amusing himself by placing his foot in the way of his sister-in-law, and she sustained a comminuted fracture of her right scapula and clavicle.

A huge volume would be filled if I were to recite the delights men and women sought, seek, found and find in the discomfiture, in the suffering, in the physical crippling and in the economic dislocations of their fellow man.

The ringing of the telephone broke off my train of thoughts. "Mr. Berger speaking. Yes. Himself. Will you tell me what I want to know?" "Yes?" "Well, I want to know about the sleeping tablets you gave me, when am I to take them? Before I go to bed or when I get up?"

* * *

December 3 . . . Seems that Murray Bowman, quiet, soft spoken and of pleasant face, is no spotless ideal of a husband. I saw a distorted image of him when I met him in a hotel room where I was hastily summoned. I found him in agonizing pain, pale, frightened and about to go into shock. The case that proved at the hospital to be one of intussusception of the descending invagination type was of sudden onset. In the room with him was an attractive girl about 20, coquettish, apparently anxious to display her femininity, probably a fool or an exhibitionist. "Meet my sister," he spoke feebly. "My youngest sister, the best of all. She would not leave me for a moment." The girl accompanied me to the door, looked carefully around, and then whispered in my ear: "Do you know his real name?"

* * *

December 6 . . . Charles Gregory is 40 years old. Walter Cox is 88 years young. Both underwent operation for hemorrhoids that were extensive. In Gregory contractures occurred after the removal of the involved tissue. In Walter Cox there was a complete recurrence of his former trouble, probably because only part of the tissue was removed. Gregory sued the surgeon for malpractice. The man of 88 laughed it off. Old in years, yet free of narrowness of sense. His individual cast of ideas is something at which to marvel. The aged gentleman is predominantly a good and wise man. He told me he has not a single enemy in the world. Why? They have all passed away. Before the war, he informed me, he was in the countries ruled by a dictator. He saw Mussolini and he looked at Franco. "Dictatorships are not so bad. Just do what you don't want and never do what you want, and you are safe."

* * *

December 11 . . . The presacral neurectomy for the dysmenorrhea of Mrs. Corbus was a phenomenal success. The painful menstruation that dislocated her social life—for the poor woman had to deny herself the ecstacy of cardplaying a week at a time—is gone. During her stay in the hospital her mother-in-law has not left her for a moment. "Some woman," she said proudly. "I hope my next mother-in-law will be just as good. Oh, have you seen my boy? Yes? He is very educated." Must be, he has been going to high school for eight years and is still going strong.

* * *

December 15 . . . Just a short, short story, about an aunt who created a problem for me. The aunt, reputedly wealthy, willed all her worldly possessions to her nephew, then came to live with him to the end of her days. The days before her were not many. Hers was a case of chronic lymphatic leukemia. My hope that urethane would accomplish wonders was

blasted. She grew progressively worse. Hospitalization was refused by the patient on the advice of her nephew.

That nephew was not easy to depict in the round. He surely did not deserve to be crowned with leafy wreaths. He displayed impatience with her prolonged illness. Time and again he inquired how far she has yet to go to reach the end of the road.

In her room as I sat at her bedside was her little grandnephew. No one else was at home. "Auntie," said the boy, "when will you close your eyes for good? Papa says when you do that, we'll have lots and lots of money. And he says he hopes it'll be soon, very soon." She focused her gaze on me, her lips quivered and tears followed one another in rapid succession. Suddenly the bloodless face assumed a determined mien. In her feeble, hardly audible voice she dictated to me: "All my property, all my money, all my investments and all other worldly possessions, I bequeath to the Church of————in the city of ————." She signed her name with her trembling hands and I witnessed it. Once more she fixed her eyes on me. But they remained fixed. The curtain came down noiselessly after her last act. The little boy now asked: "Did she close her eyes for good?"

Now what am I to do? Betray the faith of the deceased? Or reveal that the nephew was disinherited and thereby be involved in the litigation that is sure to follow?

Told Lillian Forefew that freckles are common in individuals with red hair. She dyed her hair black and wonders why the freckles don't disappear.

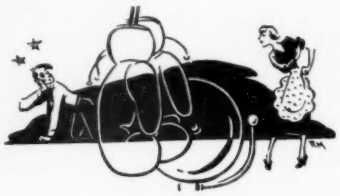
* * *

December 16 . . . Shortest, unsweetest stories ever told.

Thyrotoxicosis. Thiouracil. Agranulocytosis. Fatality.

Diagnosis: Uterine fibroma. Hysterectomy. Baby in the uterus. A gentleman with a wife also has a sweetheart. Both suffer attacks of angina pectoris. Destruction of sympathetic ganglion by vertebral injection of alcohol suggested. "Dangerous?" asked the husband and lover. "Yes," said the thoracic surgeon. "Do it to my wife," said he. Wife refused. Sweetheart consented. Postmortem.

Nice lady with pneumonia at hotel. Frequent visits, penicillin bought by me. Recovery. Came to discharge, lady not nice. Gone.



The mystery of the swelling periodically of Joe Bevin's right cheek has cleared up. His wife is left handed.

* * *

December 19 . . . The venture of young chemist Paul aroused a multitude of reactions. They ranged from anger and hatred to indiscriminate admiration. I joined the latter. To some hospital staffs Paul has become a cause for perplexity. Struggling to support comfortably his wife and mother, he sailed out on a new undertaking and is making good. He learned that half, in fact, 60 per cent of the streptomycin administered to tuberculous patients is found in the urine. He travels with buckets from one sanatorium to another, gives the inmates little gifts to urinate in the buckets. He then isolates the streptomycin and makes it ready for reinjection. That he sells and derives quite an income. On a card he printed the last lines from a poem by Mrs. Holmes of Vermont, and whenever the superintendent or an intern displays anger he shows these lines:

But if fate should mark me
to sit by your side,
Let's be pleasant travelers,
It's so short a ride.

He is now planning to open up a branch for the collection of the urine of pregnant women. He plans to establish branches all over the country for urine collection. "That new undertaking," he told me, "will revolutionize the world. People always urinate, so there will be no scarcity of that commodity."

* * *

December 21 . . . The scene is in my office. In a loud voice, Dr. Burnie protested against the immobilization of patients. He is against bed rest. He assumed a dramatic attitude, and began to read from a foreign medical journal. " 'Ah, the bed to which we flee for respite from the boisterous wind and wave of life's open sea; ah, that calm harbor: gaze at the calm smile of every curled up sleeper. Therein you see the carefree air of the fetus reclining in its amniotic fluid.' Yes. I am going to read a paper on The Crime Committed Against Patients by Immobilization."

He turned to my girl in the office: "Please tell my wife that I won't be home before midnight." The order was obeyed. "What did she say?" he asked the girl. "Well," she answered, "your wife wants to know if she can rely on that." The elderly doctor paled visibly. This is his fourth wife, and she is twenty-five years his junior. By the way, I'd like to examine the mental state of that editor, and also I'd like to see myself asleep. I am anxious to know how I look reclining in the amniotic fluid.

* * *

December 23 . . . Colleague Benson wants to know: Does hormonal stimulation predispose one to the development of mammary cancer, and if it does why didn't his mother-in-law develop it?

* * *

Gynecologist H. removes the uterus of every woman after 45 that comes to him for treatment, as a preventive against future malignancy. Should he be stopped, or encouraged?